



Five-Year Review Report

Pursuant to CERCLA

Second Five-Year Review Report Hi-Mill Manufacturing Co. Superfund Site Highland Township, Oakland County, Michigan

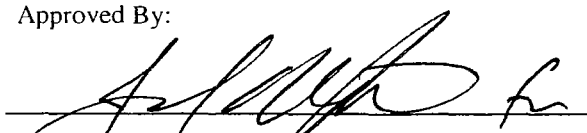
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9/29/05

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EXECUTIVE SUMMARY

The Hi-Mill Manufacturing Co. Superfund ("Hi-Mill" or "Hi-Mill Manufacturing") site is an operating facility located in Highland Township, Michigan. Highland Township, which is a suburb of Detroit, has a population of over 19,000. Approximately 2,800 of the residents are served by community water supplies, and the remainder use private wells for their source of drinking water. Contaminants of concern at the Hi-Mill Manufacturing site are volatile organic compounds (VOCs) in groundwater. Since the Record of Decision (ROD) was completed in 1993, two new community wells have been installed in the Township. One is approximately 3,000 feet west of the site, and the other is approximately 4,000 feet north of the site.

The Hi-Mill site was listed on the National Priorities List (NPL) on February 21, 1990. Pre-ROD cleanup at Hi-Mill included excavation and backfilling, with oversight by Michigan Department of Natural Resources (MDNR), of one of two lagoons behind the plant. The purpose of the excavation was to eliminate a source of inorganic contamination to the adjacent wetland and pond and to groundwater. In addition, in 1989 an on-site production well, used for both plant processes and drinking water, was constructed to replace the two original production wells that were contaminated with VOCs.

The 1993 ROD for Hi-Mill called for long-term monitoring of groundwater in the shallow and intermediate aquifers and implementation of institutional controls to restrict development of the property for residential use. Deed restrictions on the property are in place, and groundwater monitoring is being conducted.

Based on the available data, the remedy for the Hi-Mill Manufacturing site may not be protective in the short term. Although there is no known exposure currently, two Highland Township community wells will be sampled to confirm the short-term protectiveness of the remedy.

To ensure that the remedy is protective in the long term, the concerns due to the highly-elevated levels of contamination in the on- and off-site groundwater need to be addressed. Two of the concerns relate to institutional controls. Specifically, no controls are in place off-site to restrict excavating in the areas where contaminated groundwater has migrated or to protect workers who may come into contact with the contamination. The concentration of one VOC in a monitoring well located in the median of the highway adjacent of the site generally ranges from 10,000 to 15,000 ug/l. Preliminary plans for a sanitary sewer system that would be installed along the highway have been developed. The second concern related to institutional controls is about the effectiveness and enforceability of the current deed restriction on the site property.

The other primary concern about the Hi-Mill site is that the Wellhead Protection Area for two community wells to the west of the site appears to intersect with the edge of the groundwater plume emanating from the Hi-Mill facility. If the predicted wellhead area is accurate, these community wells may be drawing contaminated groundwater from Hi-Mill into the drinking water system. Another Wellhead Protection Area for two other community wells is within ½ mile of the site.

This is the second five-year review report for the Hi-Mill Manufacturing Co. site.

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List of Acronyms

ARAR	Applicable or Relevant and Appropriate Requirement
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
DNAPL	Dense Non-Aqueous Phase Liquid
IC	Institutional Control
MCL	Maximum Contaminant Level
MDEQ	Michigan Department of Environmental Quality
MDNR	Michigan Department of Natural Resources
NCP	National Contingency Plan
NPL	National Priorities List
O&M	Operation and Maintenance
PAH	Polyaromatic Hydrocarbon
PRP	Potentially Responsible Party
RA	Remedial Action
RCRA	Resource Conservation and Recovery Act
RD	Remedial Design
RI/FS	Remedial Investigation/Feasibility Study
ROD	Record of Decision
RPM	Remedial Project Manager
TCE	Trichloroethene
USEPA	United States Environmental Protection Agency
USDOJ	United States Department of Justice
VOC	Volatile Organic Compound
WPA	Wellhead Protection Area

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Five-Year Review Summary Form

SITE IDENTIFICATION		
Site name (from WasteLAN): Hi-Mill Manufacturing Co.		
USEPA ID (from WasteLAN): MID043681840		
Region: 5	State: MI	City/County: Highland Township/Oakland County
SITE STATUS		
NPL status: Final		
Remediation status: Complete		
Multiple OUs*? No	Construction completion date: March 30, 1995	
Has site been put into reuse? The original plant is still in operation at the site.		
REVIEW STATUS		
Lead agency: USEPA Region 5		
Author's name: Mary Tierney		

Author's title: Remedial Project Manager	Author's affiliation: USEPA
Review period: ** 12/01/2004 to 9/30/2005	
Date(s) of site inspection: June 22, 2005	
Type of review: Post-SARA	
Review number: Second	
Triggering action: First Five Year Review	
Triggering action date (from WasteLAN): August 25, 2000	
Due date (five years after triggering action date): August 25, 2005	

* ["OU" refers to operable unit.]

** [Review period should correspond to the actual start and end dates of the five-year review in WasteLAN.]

Five-Year Review Summary Form

Issues:

1. Lack of institutional controls to eliminate the potential direct contact pathway to workers who might be excavating soil in the median of or along the highway where the groundwater contamination plume has migrated, and questions about the adequacy and enforceability of the deed restrictions currently in place for the site property.
2. Potential threat to community wells due to: (a) intersection of a Wellhead Protection Area for two community wells with the edge of a contaminated groundwater plume from the Hi-Mill site; (b) significant increases in concentrations of trichloroethylene (TCE), both on- and off-site, since the remedial investigation; and (c) identification of a dense non-aqueous phase liquid (DNAPL) in groundwater underlying the site. The DNAPL will act as a continuing source of contamination and may increase the possibility that the two community wells would eventually draw contaminated groundwater into the community drinking water system.

Recommendations and Follow-up Actions:

1. Develop an Institutional Controls Study Plan to identify preferred options for restricting excavation in the highway median and to determine whether the current deed restriction on the site property are effective and legally enforceable and make modifications to the restriction if necessary.
2. Schedule sampling of municipal well(s) with Wellhead Protection Area(s) that potentially intersect the Hi-Mill groundwater plume. Within three months after receipt of municipal well data, identify any additional work that would be necessary to provide USEPA and Michigan Department of Environmental Quality with sufficient information to determine further actions.
3. Assess monitoring well network to determine if changes need to be made.

Protectiveness Statements:

Short-Term Protectiveness

Based on the available data, the remedy for the Hi-Mill Manufacturing site may not be protective in the short term. Although there is no known exposure currently, the Highland Township community wells will be sampled to confirm the short-term protectiveness of the remedy.

Long-Term Protectiveness

Long-term protectiveness of human health and the environment will be achieved when three issues are addressed: institutional controls are in place to restrict activities such as excavating in areas where the plume has migrated off-site; the adequacy of the current deed restriction is confirmed; and actions are taken, if necessary, to ensure that any Highland Township community wells are not being adversely impacted by the contaminated groundwater from the Hi-Mill site and that a plan to ensure continued protectiveness of the wells is in place.

Other Comments:

Four factors or circumstances have changed since the 1993 ROD: (1) contamination in groundwater has been detected at levels up to 35 times greater than was seen during the remedial investigation; (2) the presence of DNAPL on-site was identified; (3) two community wells were installed in the vicinity of the site which have a Wellhead Protection Area that appears to intersect the edge of the Hi-Mill groundwater plume; and (4) the Township has developed preliminary plans to install below-grade sewer lines along highway M-59, which would run directly in front of Hi-Mill and would be at a depth that may coincide with the groundwater contamination.

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**HIGHLAND MANUFACTURING CO. SUPERFUND SITE
OAKLAND COUNTY, MICHIGAN
FIVE-YEAR REVIEW REPORT**

I. INTRODUCTION

Authority and Purpose

The purpose of a five-year review is to determine whether the remedy at a site is protective of human health and the environment. The methods, findings, and conclusions of reviews are documented in five-year review reports. In addition, five-year review reports identify issues found during the review, if any, and identify recommendations to address them.

EPA is preparing this five-year review report pursuant to CERCLA §121 and the National Contingency Plan (NCP). CERCLA §121 states:

[i]f the President selects a remedial action that results in any hazardous substances, pollutants, or contaminants remaining at the site, the President shall review such remedial action no less often than each five years after the initiation of such remedial action to assure that human health and the environment are being protected by the remedial action being implemented. In addition, if upon such review it is the judgment of the President that action is appropriate at such site in accordance with section [104] or [106], the President shall take or require such action. The President shall report to the Congress a list of facilities for which such review is required, the results of all such reviews, and any actions taken as a result of such reviews.

EPA interpreted this requirement further in the NCP; 40 CFR §300.430(f)(4)(ii) states:

[i]f a remedial action is selected that results in hazardous substances, pollutants, or contaminants remaining at the site above levels that allow for unlimited use and unrestricted exposure, the lead agency shall review such action no less often than every five years after the initiation of the selected remedial action.

EPA, Region 5, conducted the five-year review of the remedy being implemented at the Hi-Mill Manufacturing Co. Superfund site in Oakland County, Michigan. The review was conducted by the USEPA Remedial Project Manager (RPM), Mary Tierney, with assistance from Daria Devantier and Bill Bolio, Michigan Department of Environmental Quality (MDEQ), from December 2004 through September 2005. This report documents the results of the review. The final review report will be placed in the USEPA site files and at the local repositories for the Hi-Mill Manufacturing site at the Highland Township Public Library, Highland Township, Michigan. This is the second five-year review for the Hi-Mill Manufacturing Superfund site.

The triggering action for this statutory review is the last five-year review completed on August 25, 2000. This five-year review is required due to the fact that hazardous substances, pollutants, or contaminants remain at the site above levels that allow for unlimited use and unrestricted exposure.

II. SITE CHRONOLOGY

Table 1 -- Chronology of Site Events

<i>EVENT</i>	<i>DATE</i>
Hi-Mill Manufacturing begins operating	1946
Michigan Department of Natural Resources (MDNR) issues NPDES permit for discharging; EPA does not concur with permit	1977
Underground delivery line for TCE ruptures	Between 1978 and 1980 (exact date unknown)
After obtaining approval from MDNR, Hi-Mill excavates sludge from larger lagoon and backfills it with clean fill	1983
Oakland County Health Department finds volatile organic compounds (VOCs) in on-site well used for drinking and process water	1988
Proposal to NPL	June 24, 1988
Administrative Order on Consent (AOC) issued for RI/FS entered	September 23, 1988
Final NPL Listing	February 21, 1990
Removal Assessment conducted and NRAP (no remedial action planned) decision made	June 26, 1990
RI/FS completed	September 1988 to September 1993
MDEQ letter stating non-concurrence with ROD	September 17, 1993
Record of Decision signed	September 28, 1993
Consent Decree for RD/RA entered	December 7, 1994
Preliminary Close-Out Report	March 30, 1995
Remedial Design completed	June 28, 1995
Start of Remedial Action	June 28, 1995
Construction Completion	September 21, 1995
Operations and Maintenance begin	May 17, 1996
First five-year review completed	August 25, 2000
Hi-Mill voluntarily performs a soil gas survey to define areas in which to inject oxidizing agent	August 2000
Voluntary action conducted involving injection of an oxidizing agent into shallow aquifer	July 2001

III. BACKGROUND

Physical Characteristics

The Hi-Mill Manufacturing Co. Superfund ("Hi-Mill Manufacturing" or "Hi-Mill") site is located at 1704 Highland Road in Highland Township, Oakland County, Michigan (see Attachment 1, Figure 1). The site is about 4.5 acres in area and is still an operating facility. Highland Road is the local name for the section of State highway M-59 that runs through the Township.

The one-mile stretch of State highway M-59 on which Hi-Mill site is located is not developed. A building that formerly housed the operations of a company called Numatics is located about 1,000 feet from the site, but the first commercial and other establishments on M-59 are ¼ mile along the highway to the east and ¾ mile on the highway to the west. Highway M-59 demarcates the northwestern border of the site; the other three sides of the property are adjacent to the Highland State Recreation Area. Another small piece of land across the highway from Hi-Mill Manufacturing is also part of the State recreation area. Private homes, located about 2,000 feet to the southeast, are the closest residences to the site.

Target Pond, a marshy area approximately ten acres in size, borders the site to the east, and Waterbury Lake lies about 1,000 feet to the south. Waterbury Lake is 35 to 40 acres in area. Both the lake and the pond are part of the Highland State Recreation Area. A culvert in a section of Target Pond close to the north parking lot of the Hi-Mill facility may direct drainage and surface water run-off from the site. A septic field located near the former lagoon area adjacent to the east side of the plant drains into Target Pond. Alderman Lake, which is 1,000 feet northwest of the site, receives drainage from the storm sewer located in the M-59 median. None of these areas – Target Pond, Waterbury Lake, Alderman Lake, or the Highland Recreation Area – are considered to be environmentally sensitive areas (see Attachment 1, Figure 2).

Studies have indicated three aquifers are present in the area of the site. A silty clay and clay unit appears to separate the shallow and intermediate aquifers in the immediate vicinity of the Hi-Mill site. Although a clay unit is also known to exist between the intermediate and deep aquifers, the layer thins out to the southeast of the site and the two lower aquifers become hydraulically connected. The hydrogeologic data collected during the remedial investigation showed that groundwater in the shallow aquifer flowed out radially from the site. However, groundwater monitoring data during recent years indicates that much of the contamination in the shallow aquifer is migrating toward the west. Generally, flow in the intermediate aquifer is to the west, and flow in the deep aquifer is to the southwest. The closest community well is 3000 feet west of the site.

Land and Resource Use

Highland Township is a charter township with a population of 19,169 residents. It is approximately 30 miles northwest of Detroit and is located in Oakland County, one of the wealthiest counties in Michigan. The Township covers approximately 36 square miles, of which slightly over 6% is comprised of lakes and other surface water bodies. Nearly ¼ of the land in Highland Township is owned by the State of Michigan as part of the Highland Recreation area.

The land is currently zoned industrial and is surrounded on three sides by the Highland State Recreation Area. Township officials anticipate that the land will continue to be used as an industrial parcel. In a land inventory conducted by MDNR in 2004, the Hi-Mill land was not identified as a property the State would currently be interested in obtaining.

The risk assessment for the Hi-Mill site evaluated a number of different future land uses scenarios. The pathway of greatest concern was listed as inhalation, ingestion, or direct contact by future residents of water from the shallow groundwater unit. Excess lifetime cancer risks (ELCRs) were determined to be 4×10^{-3} for adults and 3×10^{-4} for children. The hazard index (HI) for future on-site adult residents ingesting or having direct contact with shallow groundwater was calculated to be 37. The hazard index for future on-site child residents based on ingesting shallow groundwater was calculated to be 20. At the time the risk assessment for the Hi-Mill site was prepared, however, a future residential scenario was not considered to be likely. Also, the closest private drinking water wells were not in the direction of groundwater flow.

For the foreseeable future, it is likely that the Hi-Mill property will continue to be used for industrial purposes. Since 1995, however, Highland Township officials have been actively working to promote development. Although increased development in the Township may not mean the zoning of the Hi-Mill site will immediately change, the development will likely lead to underground sewer lines being installed along the M-59 corridor in front of the Hi-Mill plant, drilling of additional community wells, and increased pumping and drawdown of existing community wells.

The rates of development in nearby communities, such as White Lake Township, Hartland Township, and Waterford, have thus far been greater than in Highland due, in part, to their existing municipal infrastructure such as sanitary sewers and central water systems. Between 1990 and 2000, the township to the west of Highland experienced a 60% increase in population. Lack of a centralized municipal sewer system causes Highland Township to be subject to a number of limits on development density that Oakland County imposes on areas with parcel-by-parcel sewage disposal. Until recently, this lack of infrastructure has led developers to show a preference for building in the adjoining townships. Once the Township started working with residential developers in 1995, however, progress has been made in establishing the core of a municipal water system. A number of new subdivisions have been constructed or are in the planning stages in the area. In addition, a Sanitary Sewer Master Plan for the Township was finalized in April 2004 (see Attachment 1, Figure 3). Although the timing of the sewer construction will depend heavily on obtaining funding from the State and other sources, preliminary designs are in place.

Since 1994, five new community wells have been constructed in the Township. These were the first community wells installed since the late 1970s. The four pre-existing community wells that were installed in 1973 and 1978 are located at a significant distance from Hi-Mill. In 1994, a new well was constructed $\frac{3}{4}$ mile north of Hi-Mill. The water from this well, however, contained high iron and was taken out of operation. In 1996, a pair of community wells, Huntwood Place Wells #1 and #2, was installed 4000 feet northeast of Hi-Mill. The Huntwood wells and another pair of wells serve 1,463 residents. (See Attachment 1, Figures 4 and 5 for locations of community wells and Attachment 2 for Community Well Construction Logs.)

Two additional community wells, referred to as "Highland Valley Wells #1 and #2," were installed in 1998. These two wells are located 3,000 feet to the west of the Hi-Mill site and are of greater concern than the Huntwood wells. Together with another pair of wells, the Highland Valley wells serve 1,308 residents. The Wellhead Protection Area for the Highland Valley wells appears to intersect part of the groundwater plume originating from Hi-Mill (see Attachment 1, Figure 6).

Site Characteristics and History

Hi-Mill Manufacturing Company began operating at its current location in 1946. Hi-Mill began using TCE at the plant in 1951. Since it was established, the plant has manufactured aluminum, brass, and copper tubing parts and fittings, mainly for the refrigeration industry. Raw materials are first machined and cut, and then the tubing forms are shaped and soldered to form the final product. As of 1992, all soldering operations used silver solder or aluminum bar brazing. However, tin-lead solder may have been used in prior operations. Anodizing or "pickling" was done to brighten the parts. Manufacturing processes included use of nitric and sulfuric acid for brightening solutions, chromic-acid for parts washing, caustic soda for neutralizing non-recycled process waters, and chlorinated solvents for degreasing.

Before shipping completed tubing components, the parts were degreased by placing them in mesh containers and immersing the containers into TCE degreasing units. The parts were placed under heat lamps to remove any residual solvent. Any solvents volatilizing from the heating process or the degreasing unit were vented to the outside air. The chlorinated solvents used to degrease the fabricated parts are the source of contamination in on-site and off-site groundwater. Currently, these chlorinated VOCs, and in particular TCE, are the primary contaminants of concern at the Hi-Mill site.

One known release of TCE was from a rupture of an underground solvent delivery system in the plant. The length of time the pipes were leaking and the total volume of solvent released are not known. Other potential sources of hazardous contaminants that existed at the site included: two concrete, 1,600-gallon underground wastewater storage tanks; one 10,000-gallon fuel tank; drum storage area; four 500-gallon aboveground TCE storage tanks; one 250-gallon aboveground TCE storage tank; three 500-gallon TCE degreasers; one 1,000-gallon TCE aboveground storage tank; acid-brightening baths; and several hundred feet of underground piping system to distribute TCE throughout the plant (see Attachment 1, Figure 7). There are some inconsistencies in site documents regarding whether several of the storage containers were above- or underground.

Inorganic contamination was what initially brought the site to the attention of Michigan Department of Natural Resources (MDNR). From 1946 to 1979, wastewater tanks from acid brightening baths were regularly emptied into a lagoon east of the plant. The lagoon was about 10 feet deep, 100 feet long and 100 feet wide. The method of disposing of waste chlorinated solvents is not known.

In 1972, prompted by complaints from Hi-Mill employees to MDNR, the two on-site production wells and Target Pond were sampled for inorganic compounds. Water from one well and samples from Target Pond were found to contain elevated levels of metals. In 1976, when MDNR resampled the production wells and the pond, only the samples from Target Pond showed elevated metals to be present.

In 1976, Hi-Mill built a second, smaller lagoon south of the original one. This second lagoon was designed to receive overflow from the original lagoon (see Attachment 1, Figure 8). On two occasions in 1976 and 1977, waste in the larger lagoon overflowed into Target Pond. After the overflow came to the attention of USEPA, Hi-Mill applied for a National Pollutant Discharge and Elimination System (NPDES) permit. At that time, MDNR ordered Hi-Mill to stop discharging the untreated wastewater into the lagoon and required Hi-Mill to design a wastewater recycling and treatment program. The wastewater recycling program was used between 1981 and 1988. At that time, Hi-Mill reportedly ceased all activities that generated wastewater containing metals.

As part of the 1978 construction of the fourth addition to the plant, a concrete floor was installed over solvent delivery lines connecting degreaser tanks to TCE storage tank(s). In August 1981, the rate at which the TCE containers had to be refilled caused plant personnel to report that the underground delivery line might be damaged. It is not known whether this was the first rupture in the lines or if more minor leaks had been present prior to 1981 (see Attachment 1, Figure 8). Based on the appearance of the concrete floor, it appears that an approximate 8-inch wide section was removed along at least part of the length of the solvent delivery system so that the damaged piping could be dismantled and taken out. The width of the concrete patching currently in place indicates that a significant volume of soil could not have been removed. However, according to a letter from the potentially responsible party (PRP) dated March 4, 1998, the underground piping near the southeast end of the building, as well as the underground feeder lines to various former degreaser locations, are still in place. No soil samples were collected.

In addition, in 1946, Hi-Mill Manufacturing purchased the gas station located across the then two-lane M-59 for use as a storage facility. Sampling near the former gas station showed contaminants such as toluene and polyaromatic hydrocarbons (PAHs) to be present.

Initial Response

Removal of the piping for the underground piping, described above, was the first response taken by Hi-Mill to address site contamination. No regulatory agencies were present during the work. Between 1981 and 1983, Hi-Mill attempted to alleviate the overflow problems in the larger of the two lagoons by spraying waste liquid from the lagoon into the air. Spray nozzles were mounted on top of the production facility and along portions of the facility's 8-foot high fence. When MDNR learned of the practice in 1983, they ordered Hi-Mill to cease the activity and to begin excavation and cleanup of the lagoon. Under MDNR oversight, Hi-Mill removed and disposed of 142 cubic yards of contaminated soil; 34,400 gallons of contaminated sludge; and 63,300 gallons of contaminated wastewater. Soils along the sides of the lagoon as well as a one-foot layer of clay from the bottom of the lagoon were also excavated.

After receiving complaints about the drinking water at the plant, the Oakland County Health Department resampled the two on-site production wells. TCE and 1,2-dichloroethylene (1,2-DCE) were detected in the water. Bottled water was supplied to the employees, and in 1989, a new well was installed.

Basis for Taking Action

Hazardous substances that have been released into groundwater and soil at the Hi-Mill site and into Target Pond include aluminum, barium, chromium, copper, nickel, silver, and zinc. In addition, the following volatile organic compounds (VOCs) have also been released from the site: 1,1,1-trichloroethane (1,1,1-TCA); 1,1,2-trichloroethane (1,1,2-TCA); 1,2-dichloroethene (1,2-DCE); 1,1-dichloroethene (1,1-DCE); 1,1-dichloroethane (1,1-DCA); tetrachloroethene (PCE); trichloroethene (TCE); vinyl chloride (VC); ethylbenzene; chlorobenzene; benzene; xylenes; and toluene. A number of polyaromatic hydrocarbons (PAHs) and phthalates were also detected in groundwater. Because samples from Target Pond were analyzed for inorganic compounds only, it is unknown if any of the VOCs were released into the pond.

The three VOCs detected at the highest concentrations in groundwater during the remedial investigation (RI) were 1,1,1-TCA; 1,2-DCE; and TCE. The contaminant of most concern currently, due to the high concentrations being detected in groundwater, is TCE.

During the RI, elevated metals were detected in Target Pond sediments and in on-site soil. The ecological assessment that was conducted determined that the pond was not being adversely

affected by the metals. Sediments from Target Pond were not analyzed for VOCs or other organic compounds.

The risk assessment for the Hi-Mill site evaluated two exposure pathways: potential risk to current on-site worker due to ingestion of surface soil, and risks posed to future on-site residents due to ingestion of shallow groundwater, dermal contact with shallow groundwater and site soil, ingestion of soil, inhalation, and ingestion of garden vegetables. The exposure pathways determined to be of primary concern were ingestion of and dermal contact with shallow groundwater. Evaluation of the potential exposure showed that an adult resident drinking groundwater from the shallow aquifer would be exposed to an excess lifetime cancer risk (ELCR) of 4×10^{-3} . For children, this number was 3×10^{-4} . The hazard index (HI) for future on-site adult residents ingesting or having direct contact with shallow groundwater was calculated to be 37. The HI for a future on-site child residing on the site and ingesting shallow groundwater was calculated to be 20.

The exposure pathway related to on-site workers that was evaluated was the ingestion of on-site surface soils. The assessment indicated that current on-site workers were not at risk via this pathway. Current worker exposure to site groundwater was not evaluated because there was no indication that workers were exposed to the shallow groundwater at the site.

Because the possibility of future residential development at the site was unlikely and because no risk was found to on-site workers, no active remediation of the site was required. The installation of community wells near the Hi-Mill site and the overlap of two of the wells' Wellhead Protection Area with the groundwater plume emanating from Hi-Mill introduce new target populations that are potentially at risk.

In addition, preliminary plans to construct a municipal sewer system include constructing an interceptor sewer line below ground along highway M-59. The depth to the groundwater contamination from Hi-Mill in the highway median is similar to the typical depth at which interceptor sewers are constructed. This may introduce a possible exposure pathway to off-site workers that was not evaluated during the risk assessment.

IV. REMEDIAL ACTIONS

Remedy Selection

The Record of Decision (ROD) for the Hi-Mill Manufacturing site was signed by USEPA on September 28, 1993. The ROD was for "No Action with Groundwater Monitoring and Institutional Controls" and consisted of the following:

- "Long-term groundwater monitoring of the shallow groundwater unit and intermediate aquifer for volatile organic compounds [trichloroethylene (TCE), 1,2-dichloroethylene (DCE) and vinyl chloride (VC)].
- Long-term monitoring near nearby surface water bodies for the same constituents which are monitored for in the groundwater.
- Quarterly monitoring of the groundwater for the first three years after which consideration will [be] given to reducing sampling frequency to annually.
- Implementation of institutional controls to restrict development of the Hi-Mill property for residential use."

The ROD Declaration also states that if "analytical results...indicate the presence of contaminants above health based levels in the intermediate aquifer, a groundwater treatment system will be evaluated." And, on page 4 of the ROD, it states that if USEPA determines, based on results of long-term monitoring, that there are "unacceptable impacts,...a treatment system will be evaluated." The Statement of Work attached to the Consent Decree states that if additional information indicates that the groundwater monitoring program is inadequate, USEPA may require that additional groundwater monitoring wells be installed and/or additional parameters be analyzed. Additional information might include changes in contaminant characteristics and increases in the contaminant concentrations in groundwater.

The Final Response Design Plan, dated March 1995, outlined the objectives and rationale of the design and presented proposed locations for monitoring well, staff gauges and piezometers. Monitoring program requirements were also defined in the Final Response Design Plan. The Response Design Plan stated that sampling of surface water bodies would occur if USEPA determined it was necessary based on results of groundwater monitoring.

The design objectives outlined in the Response Design Plan were to minimize environmental and health impacts. The design rationale for the monitoring program was "to conduct monitoring at strategic locations to detect any changes to the environmental conditions at the site that may adversely impact public health or the environment."

Remedy Implementation

A Consent Decree for completion of the remedial design/remedial action (RD/RA) was entered on December 7, 1994. The parties to the Consent Decree were Robert and Richard Beard and Hi-Mill Manufacturing Company. Robert Beard has been the owner/operator of Hi-Mill from 1946 to present. Richard Beard became a co-owner of the company in the mid-1950s.

Institutional controls required by the ROD were implemented on December 22, 1994. A Preliminary Close-Out report was signed on March 30, 1995. On June 28, 1995, RD was completed and RA begun.

On-site construction consisted of installation of the monitoring wells, staff gauges and piezometers. A fence surrounding the property was already in place. Construction activities were completed on September 21, 1995, and groundwater monitoring began on May 17, 1996.

Institutional Controls

One component of the ROD for the Hi-Mill site was to implement institutional controls "to restrict development of the Hi-Mill property for residential use." These restrictions were placed on the property deed on December 22, 1994, fifteen days after the Consent Decree was entered. The restriction is meant to prohibit residential development of the site and the consumption of groundwater from the shallow aquifer (see Attachment 3). It is stated on the restriction that the requirements listed would "run with the land." USEPA has questions about whether the restriction satisfactorily achieves the intended objective of institutional control component of the ROD. In addition to the adequacy of the deed restriction, the ability to enforce the restriction against future owners of the property is not certain. The adequacy and enforceability of the deed restriction will be evaluated to ensure it will provide the protectiveness intended by the ROD.

Currently, there are no use restrictions beyond the property boundaries. This is a concern because of the planned municipal sewer system that would run below ground level along highway M-59. Although the ground level of the shoulder of the highway, which is where the lines would likely

be installed, is higher than the level of the median in which the contaminated monitoring well is located, the depth to the groundwater contamination from Hi-Mill is fairly close to the typical depth at which interceptor sewers are constructed. This may introduce exposure pathways to off-site workers that were not evaluated during the risk assessment. In addition, it would likely increase the costs of sewer construction and would significantly delay the project.

Operation and Maintenance (O&M)

Originally, the monitoring program for the Hi-Mill site included quarterly monitoring of 16 wells in the shallow aquifer and 7 wells in the intermediate aquifer. Groundwater samples were, and are currently, analyzed for VOCs only. In July 2000, USEPA approved a reduced monitoring program for the site. The current program consists of sampling of the same 23 wells annually instead of quarterly, while continuing to sample two of the 23 wells quarterly and three of the 23 sampled semi-annually (see Attachment 1, Figure 9). All five wells that are monitored more than once a year are screened in the shallow aquifer.

Of the 16 wells in the shallow aquifer, seven are located east and southeast of the source area and are meant to monitor migration of contaminants toward Target Pond and part of Waterbury Lake. Two of the remaining 9 wells are meant to monitor the source area. Of the remaining 7 shallow wells, one is located upgradient and is also adjacent to the on-site production and drinking water well, one is located in the area of the former gas station, and five monitor migration of contaminated groundwater to the west. The seven wells screened in the intermediate aquifer are located near seven of the shallow wells and are meant to monitor downward migration of the contaminants.

Funding and Operation

Annual costs of operation and maintenance (O&M) projected in the ROD for the selected remedy at the Hi-Mill site were \$88,000 per year for the first three years of monitoring and \$23,000 per year thereafter. Precise costs for the O&M work conducted by the contractor for the PRP were not provided.

V. PROGRESS SINCE THE LAST FIVE-YEAR REVIEW

Table 2 -- Actions Taken Since Last Five-Year Review

Recommendation From Previous Five-Year Review	Party Responsible	Action Taken
Re-evaluate site conditions upon completion of injection of oxidizing agent into the shallow aquifer	USEPA	On-going as part of review of groundwater monitoring results

In 2001, the contractor for the PRP performed a voluntary action involving the injection of an oxidizing agent into the shallow aquifer. The intent was to decrease the mass of VOC contamination in the shallow groundwater on the site. Some monitoring locations on the site experienced a temporary decrease in contaminant levels; others seemed to show increased contaminant levels. The action was discontinued after three injection rounds. One problem encountered was difficulty injecting planned amounts of the agent at several injection locations. In addition, it was recognized that the technique would not be effective on the dense non-aqueous phase liquid (DNAPL).

VI. FIVE-YEAR REVIEW PROCESS

Administrative Components

MDEQ and the PRP were notified of the initiation of the five-year review in October 2004. The preparation of the Hi-Mill Manufacturing five-year review was led by Mary Tierney, USEPA, with assistance and review provided by Daria Devantier and Bill Bolio, MDEQ. USEPA was the lead-Agency for the review.

The components of the five-year review schedule include:

- Community Notification
- Document Review
- Data Review
- Site Inspections
- Report Development and Review

Community Involvement

A Public Notice was published on May 27, 2005, in the Oakland Press announcing that a five-year review of the Hi-Mill site was to be conducted. Community meetings and interviews with residents and City officials were held on June 1, 2005. The residents who were interviewed were familiar with the Superfund site but didn't know any specifics about the contamination or the current status of the site. One resident said that she would prefer to see the site cleaned up rather than it not being cleaned up, but that it was not a priority for many people in the Township. Several residents were interested in maintaining the site as an active manufacturing facility. In general, awareness of the site is somewhat low in the community.

Document Review

This five-year review consisted of a review of relevant documents including the ROD, investigatory reports and studies, correspondence, preliminary close-out report, response design plan, O&M records, annual evaluation reports, and monitoring data (see Attachment 4).

Data Review

TCE is currently the main contaminant of concern at the Hi-Mill site. In part this is due to the high concentrations causing elevated detection limits, which may mask the presence of other contaminants. TCE at a concentration of 240,000 ug/l has been detected in on-site well SW-1. The average concentration of TCE in monitoring well SW-1 since O&M began is over 125,000 ug/l (see Attachment 1, Figure 10). During Phase I of the RI, conducted from 1989 to 1990, the highest level of TCE in on-site groundwater was 1100 ug/l. From the 1992 data collection during Phase II of the RI, the highest level of TCE found on-site was 6700 ug/l. 240,000 ug/l is over 35 times as concentrated as the 6700 ug/l detected during the RI. TCE in off-site monitoring well SW-24, located in the median of M-59, is on average present at approximately 15,000 ug/l (see Attachment 1, Figures 11 and 12). Maximum groundwater concentrations of three VOCs in the shallow aquifer seen during the Phase II RI and during O&M are shown below.

	Hand Auger Borings (1991/1992)	Monitoring Wells (1991/1992)	Monitoring Wells (during O&M)
TCE:	55,000 ug/l (off-site)*	6,700 ug/l	240,000 ug/l **
1,2-DCE:	3,500 ug/l	1,400 ug/l	10,000 ug/l ***
VC:	436 ug/l	60 ug/l	65 ug/l ****

- * This is the only result from an off-site monitoring well location.
- **Maximum concentration of TCE in off-site monitoring well: 17,000 ug/l.
- ***Maximum concentration of 1,2-DCE in off-site monitoring well: 3,100 ug/l.
- ****Maximum concentration of VC in off-site monitoring well: 20 ug/l.

During O&M, more than trace levels of VOCs have not been detected in the seven wells screened in the intermediate aquifer. However, prior to the RI, concentrations of TCE at levels above the maximum contaminant level (MCL) for drinking water were detected in the two on-site drinking water/production wells. Both of these wells were screened in the intermediate aquifer. Secondly, based on a review of RI groundwater data from hand auger borings and monitoring wells, recent O&M data, a review of on- and off-site stratigraphy, and locations of screens for the intermediate monitoring wells, it is likely that the current well network for monitoring the intermediate aquifer may not be intercepting the flow path of contamination in this lower aquifer.

The continuing VOC contamination from the Hi-Mill site is due to releases from former TCE storage tanks on the property. The two primary releases were reportedly from the 250-gallon tank formerly located on the plant's northeast side and the 1,000-gallon tank formerly located on the plant's southwest side. As noted previously, however, over the years the plant has been operating, other industrial chemicals have been stored at the plant that potentially could have served as sources of contamination. On-site chemical storage included: two concrete, 1,600-gallon underground wastewater storage tanks; one 10,000-gallon fuel tank; a drum storage area; four 500-gallon aboveground TCE storage tanks; one 250-gallon aboveground TCE storage tank; three 500-gallon TCE degreasers; one 1,000-gallon TCE aboveground storage tank; acid-brightening baths; and several hundred feet of underground piping system to distribute TCE throughout the plant (see Attachment 1, Figure 7). It should be noted that there are some inconsistencies in site documents regarding whether several of the storage containers listed above were above or below ground.

An unknown volume of chlorinated solvents is also believed to remain beneath the Hi-Mill building. Due to lack of optimally located monitoring wells, the exact extent of off-site migration of contaminated groundwater is not known. Groundwater in the shallow and intermediate monitoring wells to the east, south, and across highway M-59 do not appear to be highly affected; however, there are a number of concerns about the adequacy of the monitoring well network. In addition, the VOC contamination that initially brought attention to the site was present in the on-site production wells which drew water from the intermediate aquifer. Also, as stated above, TCE is present in SW-24, located in the median of M-59, at concentrations that are generally around 15,000 ug/l. Soil boring and groundwater results from the remedial investigation study indicate that it is likely that the majority of the contamination is traveling along the highway median toward the southwest. The construction of medians as drainage-ways typically involves backfilling these areas with loose sand and soil, which, for shallow groundwater, creates a conduit for flow. The distance from the median to the source area on the Hi-Mill site is about 200 feet.

Preliminary results from trend analyses are shown in Attachment 5. The seven charts are for compounds and wells where an exceedence of a maximum contaminant level (MCL) has occurred, and/or where the most recent sample result is greater than the levels seen during the initial eight sampling events, and/or where the analyses shows an increasing trend. An example chart and a table showing what the symbols for results indicate, which may assist in interpreting the chart information, are also included in the attachment.

Site Inspection

The five-year review site inspection of the Hi-Mill site was conducted on June 22, 2005, by the USEPA RPM, MDEQ personnel, and the contractor for the PRP. The purpose of the inspection was to assess the general condition of the site and of monitoring wells, staff gauges and piezometers, and ensure records and site documents were available and up-to-date. (See Attachment 6 for site inspection notes on monitoring well conditions.) Overall, the intent was to collect information to be able to better assess the protectiveness of the remedy and try to foresee any future remedy implementation problems and needs. Interviews with residents in the area and with Township officials were conducted on June 1, 2005. Perspectives and comments about the site from interviews are summarized in the Community Involvement section of this report.

VII. TECHNICAL ASSESSMENT

Question A: Is the remedy functioning as intended by the decision documents?

No. Institutional controls currently in place do not address exposure pathways to contamination that has migrated beyond property boundaries. Potential exposure pathways include direct contact with contaminated groundwater by off-site workers and ingestion of groundwater from community wells that may become contaminated if groundwater from the Hi-Mill site is drawn into the system. In addition, there are some questions about the adequacy and enforceability of the current deed restrictions on the site property that were implemented according to the ROD.

Question B: Are the exposure assumptions, toxicity data, cleanup levels, and remedial action objectives (RAOs) used at the time of the remedy selection still valid?

No. Three developments since the site ROD was signed may introduce new potential exposure pathways. No changes in toxicity data for contaminants from the Hi-Mill site have occurred. The ROD did not specify cleanup levels.

Changes in Standards and To-Be-Considered Requirements

A list of ARARs is included in Attachment 7. There have been no changes in these ARARs and no new standards or to be considered (TBC) requirements that would affect the protectiveness of the remedy.

Changes in Exposure Pathways, Toxicity, and Other Contaminant Characteristics

At the time the risk assessment for the Hi-Mill site was completed, the probability that the property would be developed for residential use and the shallow aquifer used as a source of drinking water was considered to be low. The site is not currently residential, nor is it expected to become residential in the near future. However, installation of several community wells that have the potential to draw groundwater contaminated by the Hi-Mill site indicate that ingestion of site groundwater is more likely than it was at the time the ROD was signed.

A second exposure pathway that is not being addressed by institutional controls or otherwise relates to off-site workers who may be involved in excavation work along highway M-59. In this scenario, workers could potentially come into dermal contact with contaminated groundwater.

Question C: Has any other information come to light that could call into question the protectiveness of the remedy?

Yes. Concentrations of TCE both on-site and off-site have greatly increased. Furthermore, the presence of a principal threat, in the form of a DNAPL, has been identified. DNAPL is present in

at least one on-site monitoring well and may also be present in an off-site monitoring well. As noted above, since the time the ROD was written, several community wells were installed near the site. The Wellhead Protection Area estimated for two of the new community wells appears to overlap with part of the Hi-Mill groundwater contamination plume.

Technical Assessment Summary

Four changes have arisen since the Hi-Mill ROD was signed in 1993 that indicate the site remedy should be reviewed. Two of the four issues relate to introduction of two new potential exposure pathways. Another is a change in contaminant levels both on- and off-site since the remedial investigation. The last issue relates to identification of a principal threat, in the form of a DNAPL, on the site.

Several developments after the 1993 ROD have introduced the potential for new site exposure pathways. One is the migration of highly-contaminated groundwater off-site into the area beneath highway M-59 and planned below-grade construction work along the highway. This introduces the potential for dermal contact with shallow groundwater by off-site workers. Secondly, community wells have been installed that may be drawing groundwater from the edge of the groundwater plume from Hi-Mill. This introduces the potential exposure pathway of ingestion of contaminated groundwater by residents served by a community well that might become contaminated due to the Hi-Mill site.

The original risk assessment for the site evaluated two exposure pathways: (1) the potential risk to current on-site workers due to ingestion of surface soil; and (2) the risks posed to future on-site residents due to ingestion of shallow groundwater, dermal contact with shallow groundwater and site soil, ingestion of soil, inhalation, and ingestion of garden vegetables. In the risk assessment, the exposure pathways determined to be of primary concern were ingestion of and dermal contact with shallow groundwater. Evaluation of the potential exposure showed that an adult resident drinking groundwater from the shallow aquifer would be exposed to an excess lifetime cancer risk (ELCR) of 4×10^{-3} . For children, this number was 3×10^{-4} . The hazard index (HI) for future on-site adult residents ingesting or having direct contact with shallow groundwater was calculated to be 37. The HI for a future on-site child residing on the site and ingesting shallow groundwater was calculated to be 20.

Based on the information available at the time of the ROD, however, it was determined that it was unlikely that the shallow groundwater would be used for a drinking water source. The probable overlap of the groundwater plume from the Hi-Mill site and the hydraulic capture zone for two operating municipal wells indicate that this pathway needs to be reevaluated.

The exposure pathway related to on-site workers that was evaluated in the site risk assessment was the ingestion of on-site surface soils. The assessment indicated that current on-site workers were not at risk via this pathway. Current worker exposure to site groundwater was not evaluated because there was no indication that workers were exposed to the shallow groundwater at the site. The Township finalized preliminary plans for construction of a municipal sewer system that would include a below-ground interceptor sewer line along highway M-59. The depth to the groundwater contamination from Hi-Mill in the highway median is similar to the typical depth at which interceptor sewers are constructed. This may introduce a possible exposure pathway to off-site workers, via dermal contact with contaminated groundwater, which was not evaluated during the risk assessment.

The identification of a DNAPL on-site, which will act as a continuing source of groundwater contamination, and the significant increase in concentrations of VOCs, in particular TCE, since

the time of the remedial investigation, also are circumstances that differ from those present when the ROD was signed in 1993. The highest on-site concentration of TCE detected since O&M began is approximately 35 times greater than the highest on-site concentration detected during the RI.

To ensure the remedy is protective in the long term, samples will be collected from the two community wells, additional data collected if necessary, and the remedy will be reviewed. In addition the monitoring well network will be assessed to determine if modifications need to be made. To prevent potential exposure pathways from becoming actual exposure pathways, institutional controls will be implemented to prohibit excavation and drilling off-site, the adequacy and legal enforceability of the current deed restrictions will be evaluated, and the appropriateness of the remedy will be reviewed. An Institutional Control Study Plan will be developed to evaluate options and develop implementation and monitoring plans for off-site restrictions, assess the effectiveness and legal aspects of the existing deed restriction and identify and modifications necessary.

VIII. ISSUES

Table 3 - Issues

Issue	Currently Affects Protectiveness (Y/N)	Affects Future Protectiveness (Y/N)
Lack of institutional controls to prevent potential direct contact pathway for workers who might be excavating soil in the median of or along the highway where the plume has migrated. Also, uncertainty about whether deed restrictions currently in place are effective and legally binding and enforceable.	N	Y
Potential exposure pathway to two community supply wells due to: (1) Wellhead Protection Areas intersecting with contaminated groundwater plume from Hi-Mill; (2) presence of on-site DNAPL which could act a continuing source of contamination to groundwater; and (3) significantly increased concentrations of TCE both on- and off-site.	Y	Y

IX. RECOMMENDATIONS AND FOLLOW-UP ACTIONS

Table 4 - Recommendations and Follow-Up Actions

Issue	Recommendations/ Follow-Up Actions	Lead Agency	Oversight Agency	Milestone Date	Affects Protectiveness? (Y/N)	
					Current	Future
Lack of institutional controls (ICs) to prevent potential direct contact pathway for workers who might be excavating soil in the median of or along the highway where the plume has migrated. Also, questions as to whether existing deed restrictions are effective and will be legally binding and enforceable.	Develop an IC Study Plan to: (1) identify preferred options for restricting excavating along M-59 in the area of the plume; and (2) evaluate adequacy and enforceability of deed restriction currently in place on the site property	PRP	MDEQ and USEPA	April 2006	N	Y
Potential threat to community wells due to: (1) intersection of the WPA for the well with contaminated groundwater from the Hi-Mill site; (2) presence of on-site DNAPL, which could act as a continuing source of groundwater contamination; (3) significantly increased concentrations of TCE both on- and off-site since RI	(1) Sample municipal well(s) w/ WPA(s) that potentially intersect the Hi-Mill groundwater plume;	(1) PRP	MDEQ and USEPA	December 2005	Y	Y
	(2) within three months after receipt of data from municipal well sampling, identify any additional work that needs to be done so that the Agencies have sufficient information to determine further actions that need to be taken; (3) evaluate sampling frequency and adequacy of monitoring well	(2) USEPA	MDEQ	3 months after receipt of data		
		(3) USEPA	MDEQ	March 2006		

X. PROTECTIVENESS STATEMENT

Based on a review of relevant documents, data, ARARs, risk assumptions, and the results of the site inspection, the remedy for the Hi-Mill site may not be protective in the short term. Although there is no known exposure currently, the Highland Township community wells will be sampled to confirm that short-term protectiveness is in place. To ensure the remedy is protective in the long term, institutional controls must be implemented to prevent exposure to contaminants that have migrated off-site, the effectiveness and legal enforceability of the existing deed restriction must be confirmed, and the adequacy of the remedy must be evaluated to determine if modifications are needed.

XI. NEXT REVIEW

The next five-year review will be completed by August 2010, approximately five years from the date of this review.

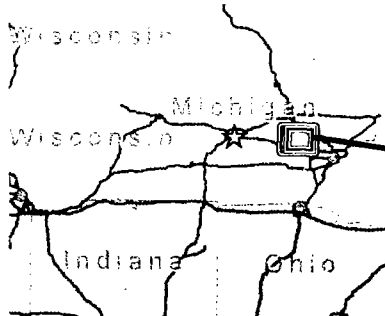
ATTACHMENTS

ATTACHMENT 1

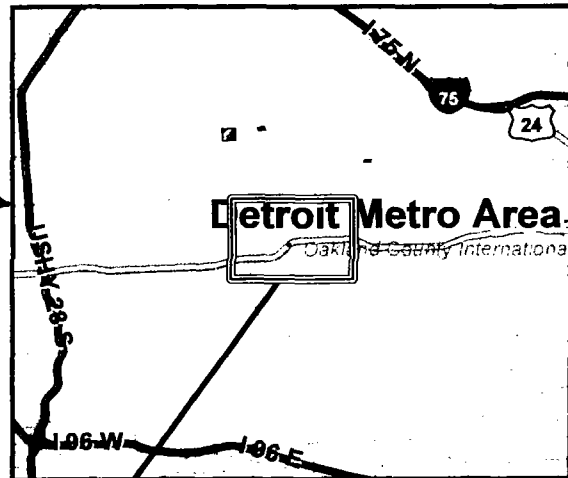
FIGURES

Hi-Mill Manufacturing Company Superfund Site, Michigan

1) State



2) Oakland County



3) Hi-Mill Site



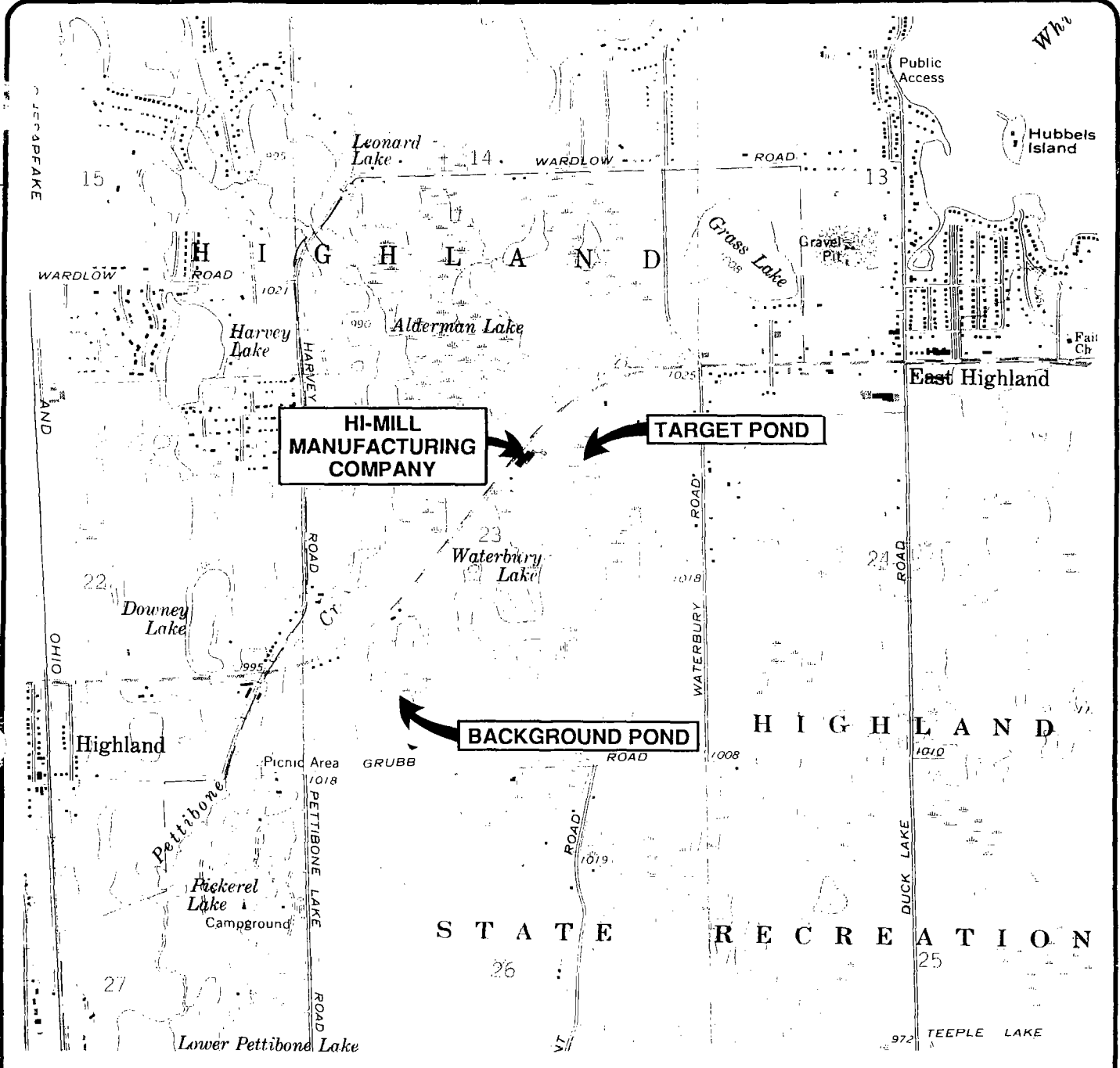
Attachment 1
Figure 1



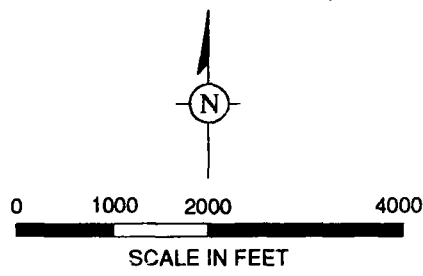
Plot created by Nasser Sharique
U.S. EPA Region 5 on 4/13/2005

Figure 1

DRAFT
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 PRJCT NO.: MI135.04
 DATE: 20APR92
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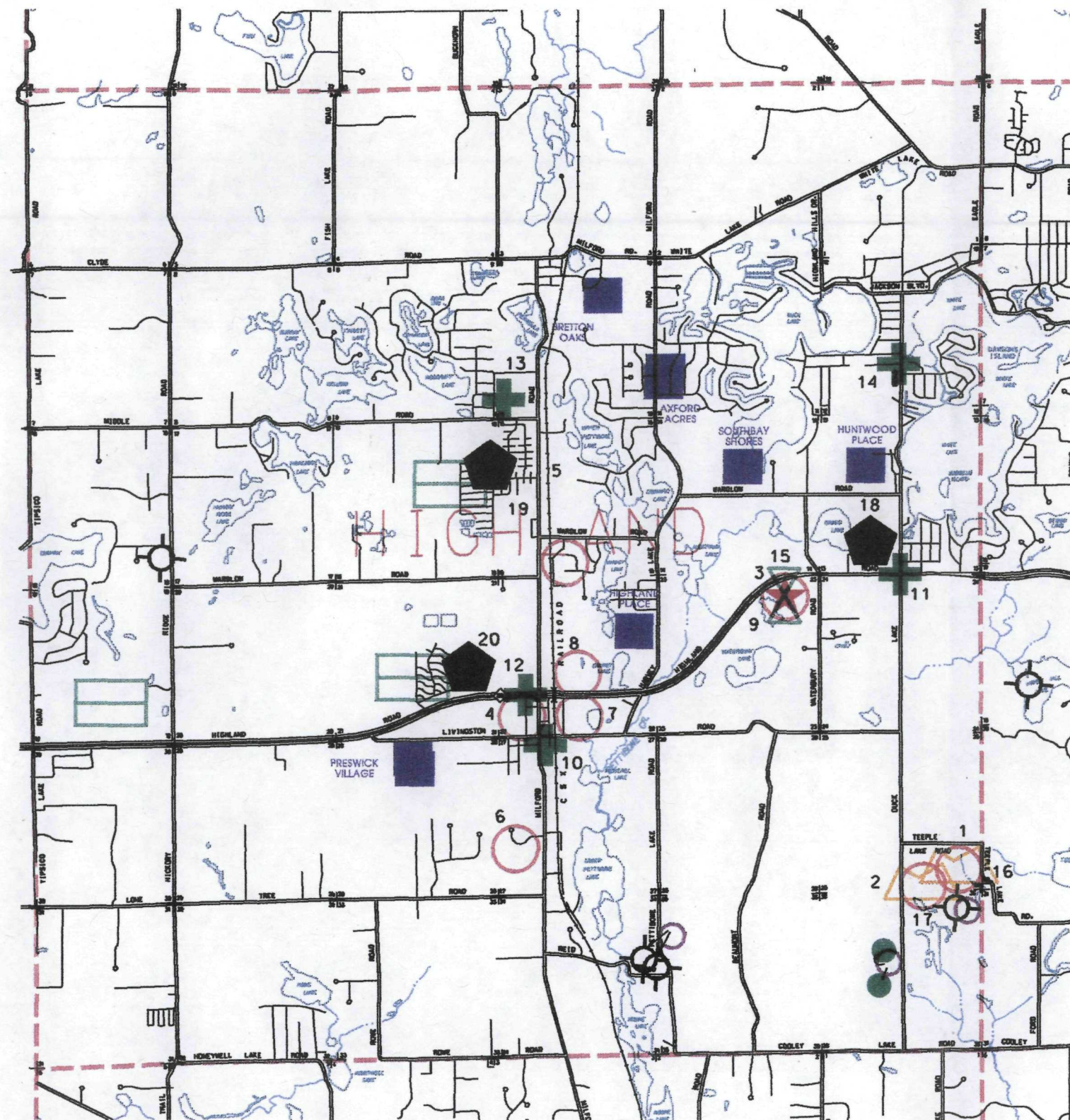


SOURCE: USGS 7.5 Minute Topographic Map, HIGHLAND, MICHIGAN Quadrangle, 1983



SITE LOCATION MA
 HI-MILL MANUFACTURING COM
 HIGHLAND, MICHIGAN

Figure 2



Legend

- CERCLIS
- HWS (ACT 307)
- + LEAKING UST SITE
- ★ NATIONAL PRIORITIES LIST
- △ SOLID WASTE FACILITIES
- ▽ TOXIC RELEASE INVENTORY (1992)
- WELL - COUNTY OPERATED
- WELL - NON-COUNTY OPERATED
- ▲ LANDFILL - CURRENTLY LICENSED
- ▲ LANDFILL - FORMERLY LICENSED
- INCINERATOR - CURRENTLY LICENSED
- INCINERATOR - FORMERLY LICENSED
- ⌘ DISPOSAL SITE - PRE-ACT 87
- TRANSFER STATION - CURRENTLY LICENSED
- OIL WELL
- ⊙ DRY HOLE
- ⊙ GAS WELL
- ⊙ BRINE DISPOSAL WELL
- ⊙ INJECTION WELL
- ⊙ ALL OTHER WELLS
- SURFACE LOCATION
- GW DISCHARGING FACILITIES
- MOBILE HOME PARKS W/ON-SITE WWTP

NOTE: ALL SYMBOLS ARE ENLARGED FOR EASE OF VIEWING.

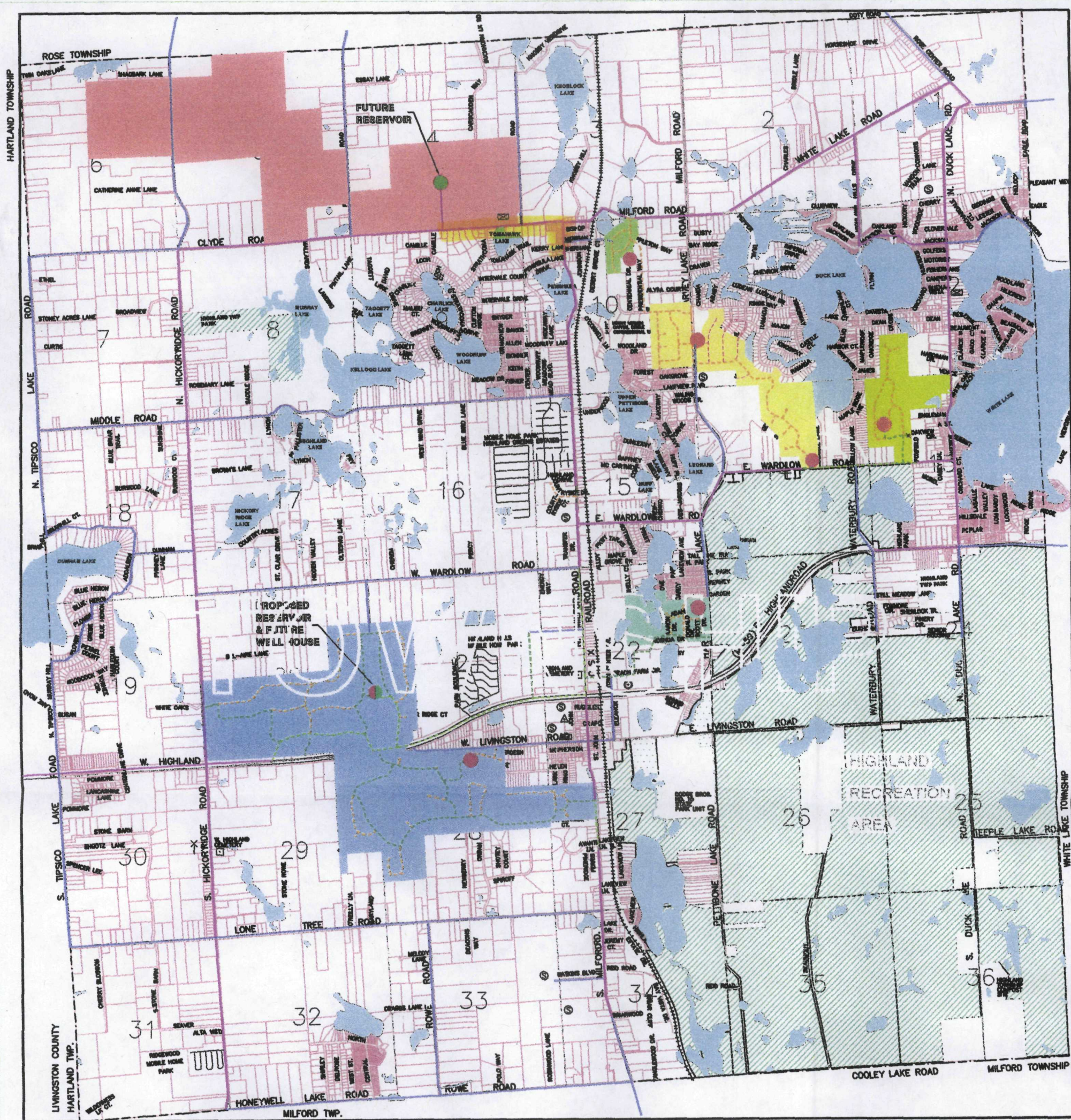
Oakland County Drain Commissioner Wellhead Protection Program Preliminary Environmental Sources of Concern Highland Township Map

Figure 4

OAKLAND COUNTY BASE MAP
PROVIDED BY OAKLAND COUNTY DEVELOPMENT & PLANNING
Created: January, 1996
©1995, Oakland County

0 5000 10,000





LEGEND

- PROPOSED 12" WATER
- PROPOSED 16" WATER
- - - EXISTING 6" WATER
- - - EXISTING 8" WATER
- - - EXISTING 12" WATER
- - - EXISTING 16" WATER
- EXISTING MOBILE PARK HOME
- EXISTING WELL HOUSE
- RESERVOIR
- WELL HOUSE/RESERVOIR
- SCHOOLS
- FIRE STATION
- ▲ TOWNSHIP HALL
- CEMETERY
- ✕ CHURCHES
- POST OFFICE
- ✕ GATE

WATER SERVICE DISTRICTS

- HIGHLAND VALLEY
- HUNTWOOD PLACE
- BRETTON OAKS
- AXFORD ACRES/ SOUTH BAY SHORES
- LEVY CORP.
- PRESTWICK VILLAGE

PRELIMINARY

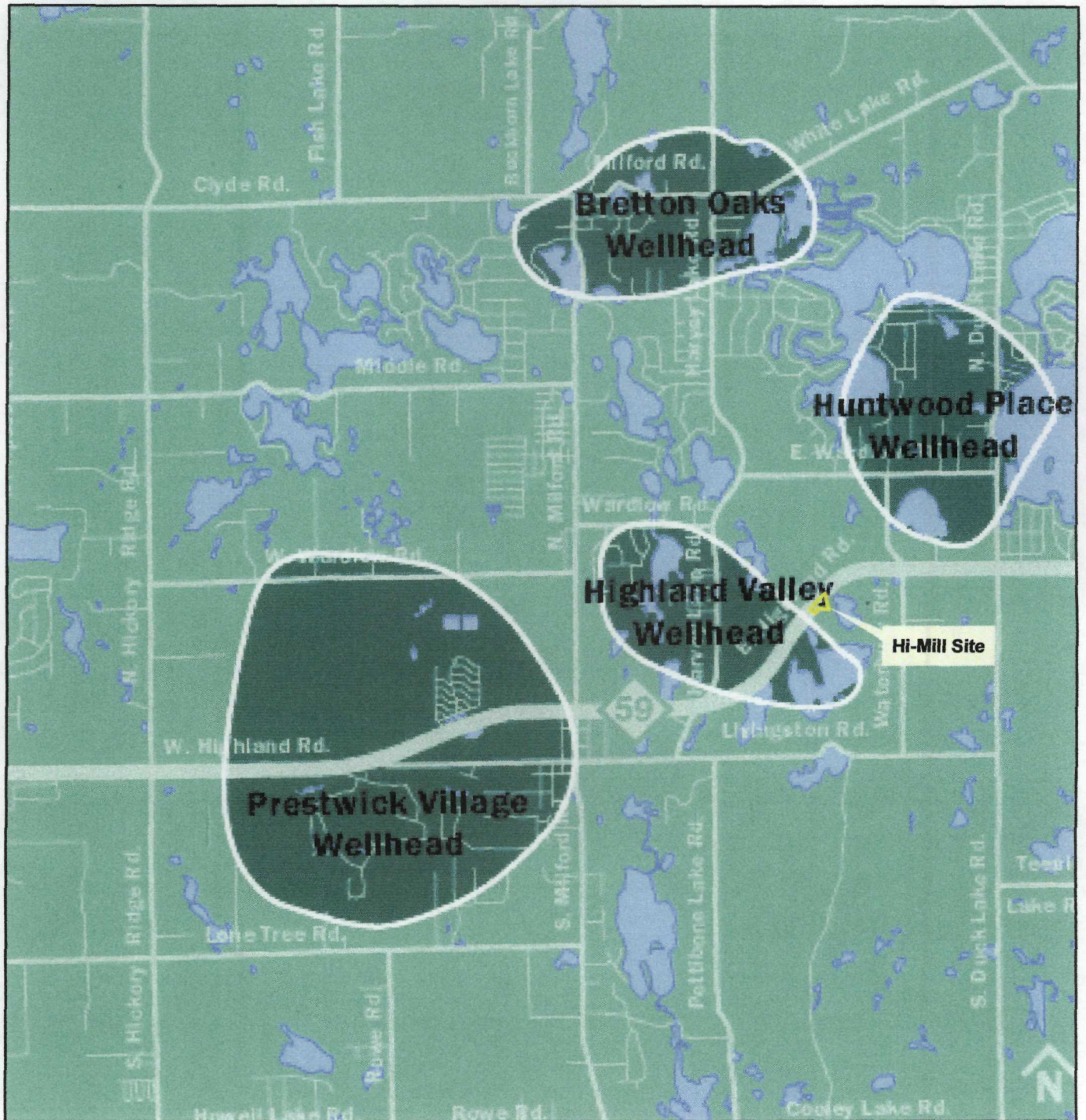


HIGHLAND TOWNSHIP OAKLAND COUNTY, MICHIGAN WATER SUPPLY SYSTEMS

PREPARED BY:
POWELL & ASSOCIATES, ENGINEERS, INC.
110 AUDUBON DRIVE, SUITE A
WHITE LAKE, MI 48381
PHONE: (248) 889-9669
FAX: (248) 889-9779
EMAIL: powell@teleweb.net

Figure 5

Hi-Mill Manufacturing Site Wellhead Protection Areas in Highland Township



Plot created by Andrea Porter U.S. EPA Region 5 on 9/26/2005



1 0.5 0 1 Miles

Figure 6

Figure 7

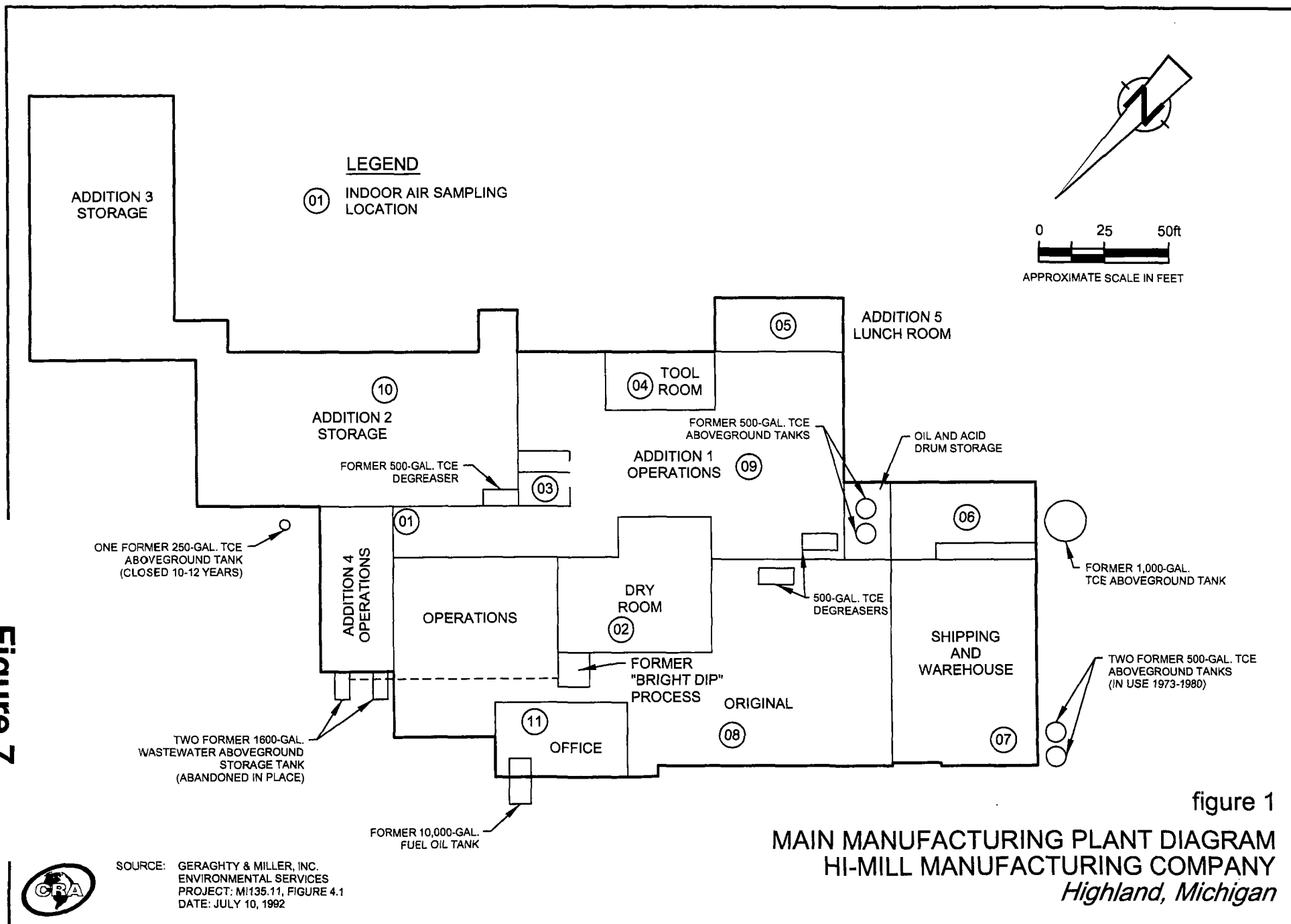
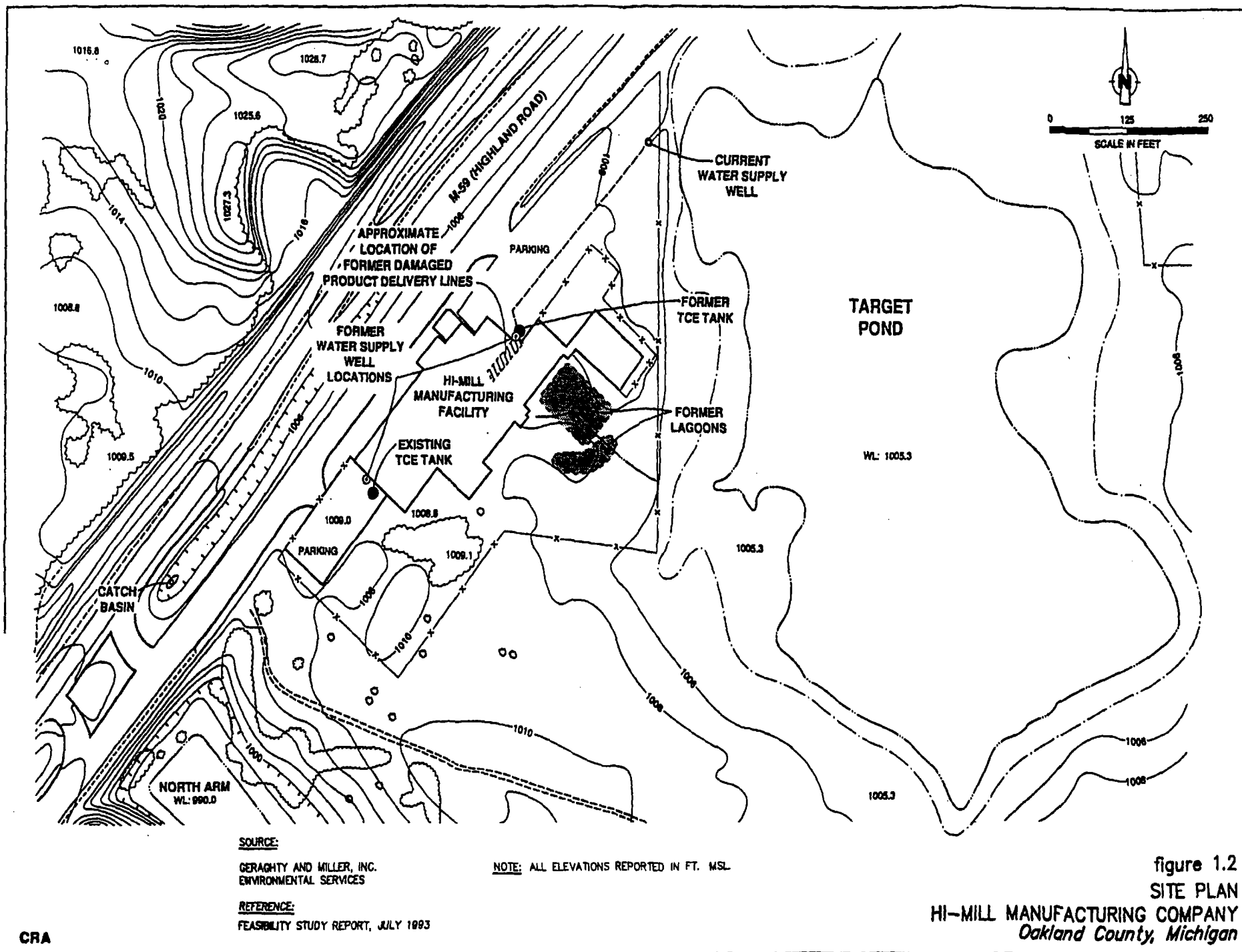


Figure 8



CRA

Hi-Mill Site: TCE Concentrations at SW-1

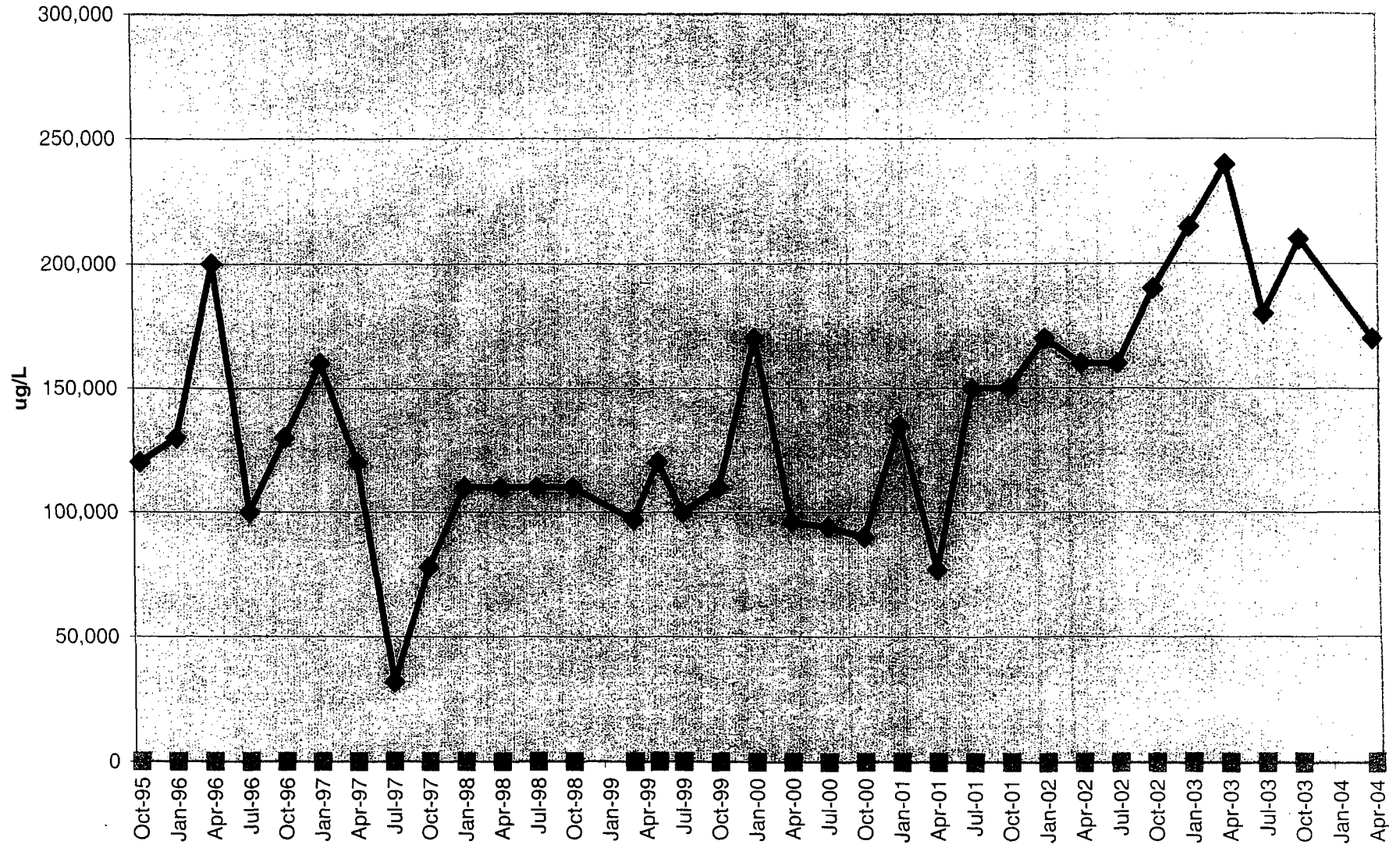


Figure 10

Hi-Mill Site: Concentration of TCE at SW-24

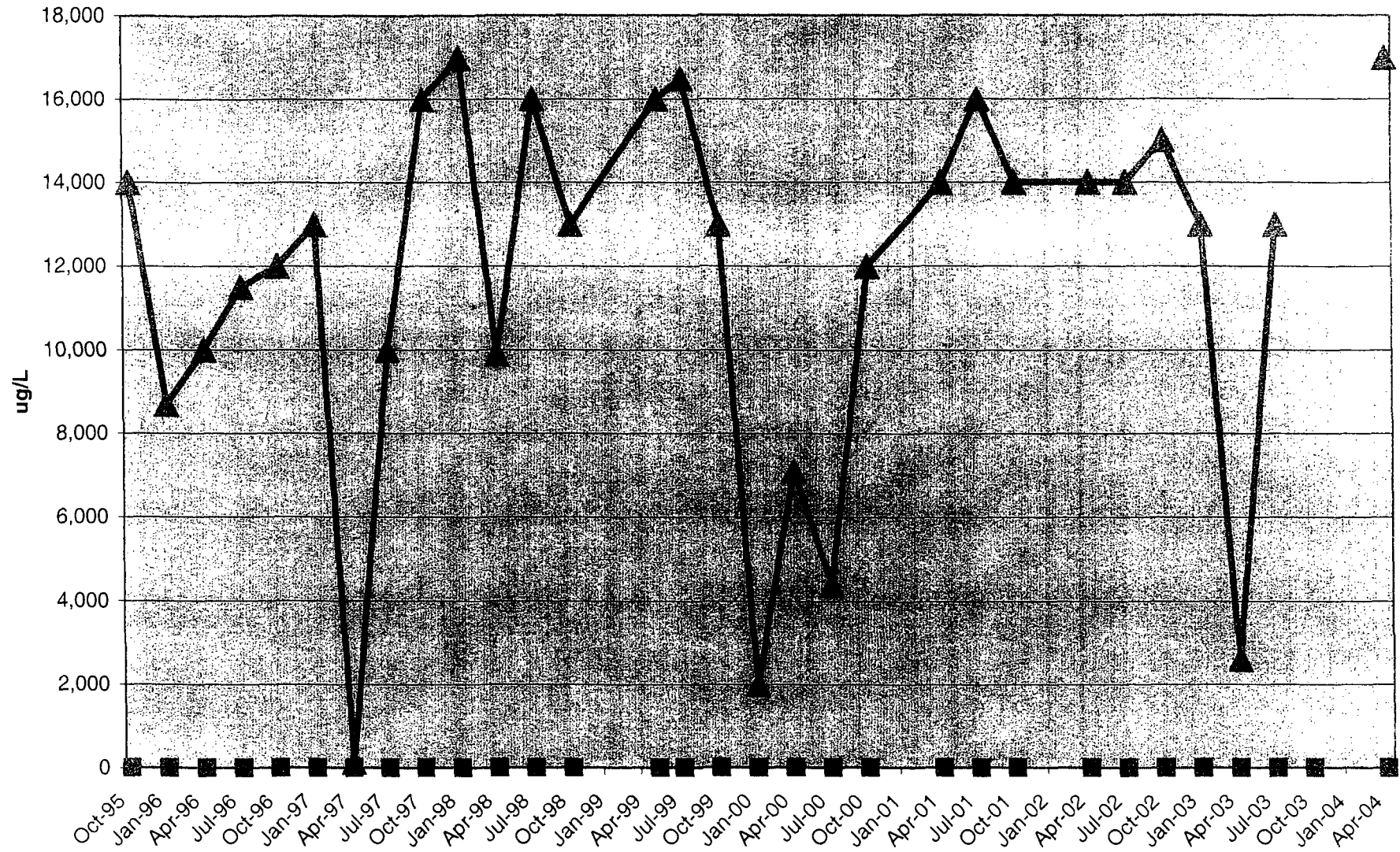


Figure 11

Hi-Mill Site: TCE at SW-1 and SW-24

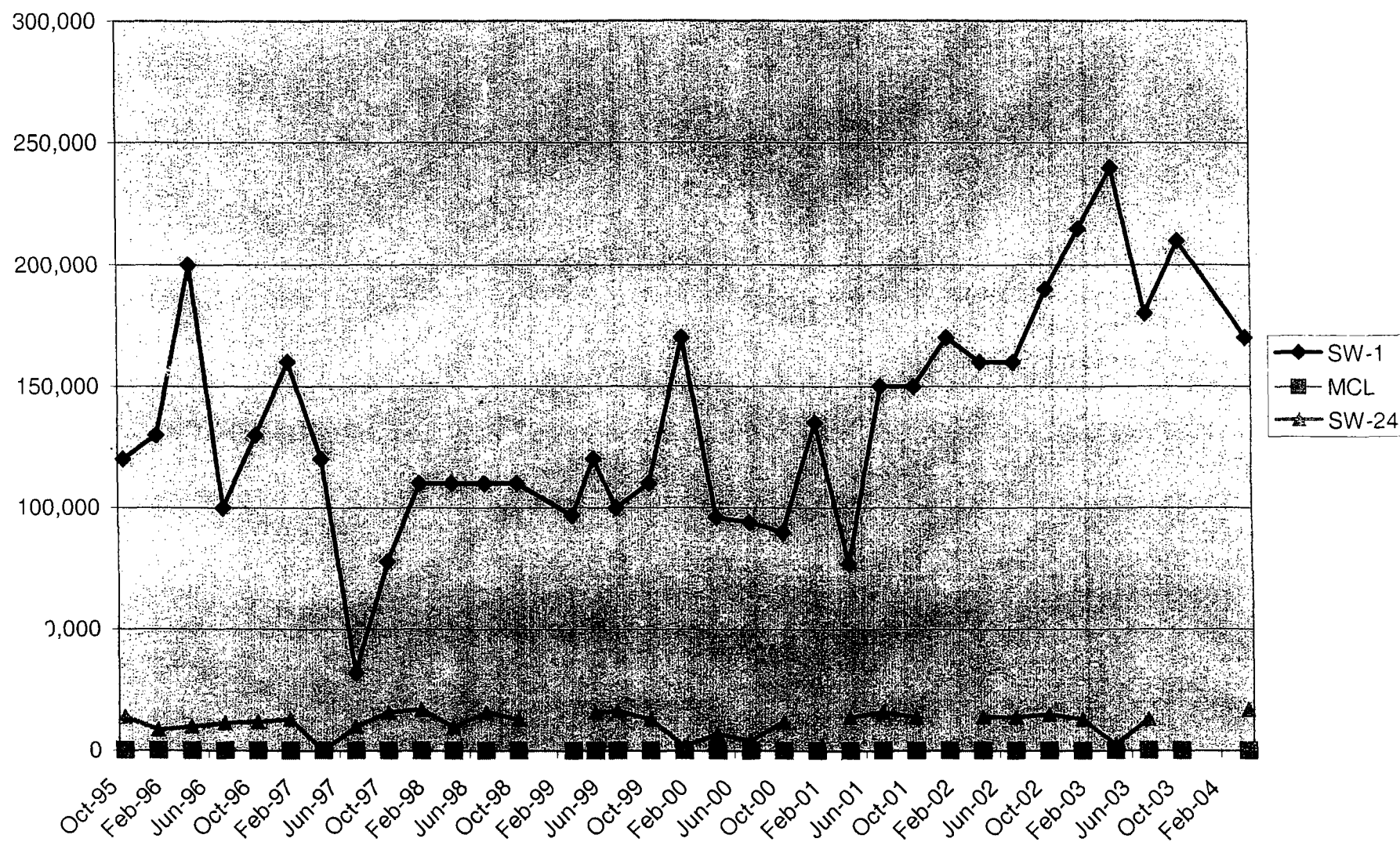


Figure 12

ATTACHMENT 2

COMMUNITY WELL CONSTRUCTION LOGS



WATER WELL AND PUMP RECORD

Completion is required under authority of Part 127 Act 368 PA 1978.

Well ID: 63000017146

Failure to comply is a misdemeanor.

Tax No: 11-22-276-001	Permit No: W984200	County: Oakland	Township: Highland		
Well ID: 63000017146 Elevation: Latitude: 42.64906029 Longitude: -83.60362469	Fraction: NE¼ SE¼ NE¼	Section: 22	Town/Range: 03N 07E	French Claim:	WSSN: 6185
	Distance and Direction from Road Intersection: Old WSSN 3144; Highland Valley Subdivision; NEW WSSN 6185- SW Highland Township Water Authority; about 1/2mi N of M59& 100ft W of Harvey Lk RD				
	Well Name: Highland Valley Well #1				
	Well Owner: Ocde				
	Well Address: Highland Valley Well #1 Highland MI		Owner Address: Waterford MI		

Drilling Method: Hollow rod	Pump Installed: Yes	Pump Installation only: No		
Well Depth: 241.00 ft.	Well Use: Type I public	Pump Installation date:	HP: 75.00	
Well Type: New	Date Completed: 6/10/1998	Manufacturer: Unknown	Pump Type: Vertical turbine	
Casing Type: PVC plastic		Model Number:	Pump Capacity: 900.00 GPM	
Casing Joint: Welded		Length of Drop Pipe: 120.00 ft.	Id of Well:	
Diameter: 12.00 in. to 198.50 ft. depth		Diameter of Drop Pipe:		
		Draw Down Seal Used: No		
Bore Diameter 1: Unknown in. to		Pressure Tank Installed: Yes		
Bore Diameter 2:		Pressure Tank Type: Other		
Bore Diameter 3:		Manufacturer: Unknown		
Height: 2.50 ft. above grade		Model Number :	Tank Capacity : 9000 Gallons	
Casing Fitting: None		Pressure Relief Valve Installed : No		
Static Water Level: 18.56 ft. Below Grade(Not Flowing)		Formation Description	Thickness	Depth to Bottom
Yield Test Method: Test pump		Sand	22.00	22.00
Measurement Taken During Pump Test:		Sand & Gravel	46.00	68.00
84.00 ft. after 8.00 hrs. pumping at 900.00 GPM		Sand Fine	20.00	88.00
		Sand & Gravel	10.00	98.00
Abandoned Well Plugged: No		Sand Wet/Moist	15.00	113.00
Reason for not plugging Well:		Sand Fine	22.00	135.00
Abandoned well ID:		Sand Wet/Moist	6.00	141.00
Screen Installed: Yes	Well Intake:	Sand Fine	100.00	241.00
Filter Packed: No				
Screen Diameter: 12.00 in.	Length: 50.25 ft.			
Screen Material Type: Stainless steel-gauze				
Slot: 12.00 in. Set Between 198.50 ft. and 241.00 ft.				
Blank: 2.75 ft. Above				
Fittings:				
Blank above screen				
Well Grouted: Yes	Grouting Method: Other	Geology Remarks:		
No. of Bags: 29	Additives: None			
Grouting Materials:				
Bentonite dry granular	From 0.00 ft. to 198.50 ft.			
Well Head Completion:	12 inches above grade			
Nearest source of possible contamination:		Contractor Type: Water well drilling contractor		
Type	Distance Direction	Registration Number: 25		
Sewer line	100.00 ft.	Business Name: OO Corsaut		
		Business Address:		
Drilling Machine Operator Name: Wayne Hambell		WATER WELL CONTRACTOR'S CERTIFICATION:		
Employment: Employee		This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.		
		Signature of Registered Representative	Date	
General Remarks:				
OTHER REMARKS Grouting Method: funnel method Pressure Tank Type: hydropneumatic				



WATER WELL AND PUMP RECORD

Completion is required under authority of Part 127 Act 368 PA 1978.

Well ID: 63000017147

Failure to comply is a misdemeanor.

Tax No:	Permit No: W984200	County: Oakland	Township: Highland
Well ID: 63000017147 Elevation: 1014 ft Latitude: 42.649304 Longitude: -83.603842	Fraction: NE 1/4 SE 1/4 NE 1/4	Section: 22	Town/Range: 03N 07E
	French Claim: WSSN: 6185		
	Distance and Direction from Road Intersection: Old WSSN 3144; Highland Valley Subdivision. New WSSN 6185-SW Highland Township Water Authority. Harvey Lk Road and M-59		
	Well Name: Highland Valley Well #2		
	Well Owner: Ocde		
Well Address: Highland Valley Well #2 Highland MI		Owner Address: Waterford MI	

Drilling Method: Unknown	Pump Installed: Yes	Pump Installation only: No
Well Depth: 242.00 ft.	Well Use: Type I public	HP: 75.00
Well Type: New	Date Completed: 6/10/1998	Pump Type: Vertical turbine
Casing Type: Unknown	Manufacturer: Unknown	Pump Capacity: 900.00 GPM
Casing Joint: Unknown	Model Number:	Id of Well:
Diameter: 12.00 in. to 196.00 ft. depth	Length of Drop Pipe: 120.00 ft.	
	Diameter of Drop Pipe:	
Bore Diameter 1: Unknown in. to	Draw Down Seal Used: No	
Bore Diameter 2:	Pressure Tank Installed: Yes	
Bore Diameter 3:	Pressure Tank Type: Other	
Height: 2.50 ft. above grade	Manufacturer: Unknown	Tank Capacity: 9000 Gallons
Casing Fitting: None	Model Number:	
	Pressure Relief Valve Installed: No	
Static Water Level: 18.56 ft. Below Grade(Not Flowing)	Formation Description	Thickness
Yield Test Method: Test pump		Depth to Bottom
Measurement Taken During Pump Test:	Sand	22.00
84.00 ft. after 8.00 hrs. pumping at 900.00 GPM	Sand & Gravel	46.00
	Sand Fine	20.00
Abandoned Well Plugged: No	Sand & Gravel	10.00
Reason for not plugging Well:	Sand Wet/Moist	15.00
	Sand Fine	22.00
Abandoned well ID:	Sand Wet/Moist	6.00
Screen Installed: Yes	Sand Fine	101.00
Filter Packed: No		242.00
Screen Diameter: 12.00 in.		
Length: 50.25 ft.		
Screen Material Type: Stainless steel-slotted		
Slot: 12.00 in.		
Blank: 1.00 ft. Above		
Fittings:		
Blank above screen		
Well Grouted: Yes	Grouting Method: Unknown	
No. of Bags:	Additives: None	
Grouting Materials:		
Unknown		
Well Head Completion:		
12 inches above grade		
Nearest source of possible contamination:	Contractor Type: Water well drilling contractor	
Type	Registration Number: 25	
Unknown	Business Name: OO corsaut	
Unknown	Business Address:	
Drilling Machine Operator Name: wayne Hambell	WATER WELL CONTRACTOR'S CERTIFICATION:	
Employment: Employee	This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.	
	Signature of Registered Representative	Date
General Remarks:		
OTHER REMARKS Pressure Tank Type: hydropneumatic		

EQP 2017C (2/2000)

ATTENTION WELL OWNER: FILE WITH DEED

4/1/2003 10.18



WATER WELL AND PUMP RECORD

Completion is required under authority of Part 127 Act 368 PA 1978.

Well ID: 63000004821

Failure to comply is a misdemeanor.

Import ID: 63037710301

Tax No:	Permit No:	County: Oakland	Township: Highland
Well ID: 63000004821		Fraction: U $\frac{1}{4}$ U $\frac{1}{4}$ U $\frac{1}{4}$	Section: 10
Elevation: 1030 ft		Town/Range: 03N 07E	French Claim: WSSN: 3312
Latitude: 42.678052		Distance and Direction from Road Intersection: old WSSN 00835; 1200FT S OF MILFORD 820FT W OF N PROP W OF NE Highland township water authority wssn 3312	
Longitude: -83.61194		Well Name: Bretton Oaks Well #1	
		Well Owner: Oakland Co Drain Commission	
		Well Address: BRETTON OAKS SUB WELL#1 HIGHLAND TWP MI	Owner Address: WATERFORD MI

Drilling Method: Unknown	Pump Installed: No	Pump Installation only:	
Well Depth: 177.00 ft.	Well Use: Type I public	HP:	
Well Type: Replacement	Date Completed: 9/26/1977	Pump Type:	
Casing Type: Unknown		Pump Capacity:	
Casing Joint: Unknown		Id of Well:	
Diameter: 6.00 in. to 163.00 ft. depth			
Bore Diameter 1:	Pressure Tank Installed: No		
Bore Diameter 2:	Pressure Tank Type:		
Bore Diameter 3:	Manufacturer:		
Height: 2.00 ft. above grade	Model Number:	Tank Capacity: Gallons	
Casing Fitting: None	Pressure Relief Valve Installed: No		
Static Water Level: 28.00 ft. Below Grade(Not Flowing)	Formation Description	Thickness	Depth to Bottom
Yield Test Method: Unknown	Yellow Sand	6.00	6.00
Measurement Taken During Pump Test:	Gravel Sandy	6.00	12.00
53.00 ft. after 8.00 hrs. pumping at 302.00 GPM	Yellow Sand Fine	8.00	20.00
Abandoned Well Plugged: No	Yellow Sand & Gravel	44.00	64.00
Reason for not plugging Well:	Clay	2.00	66.00
Abandoned well ID:	Sand Fine Wet/Moist	10.00	76.00
Screen Installed: Yes	Sand Gummy	14.00	90.00
Filter Packed: No	Blue Clay	29.00	119.00
Screen Diameter: 6.00 in.	Hardpan	25.00	144.00
Length: 15.00 ft.	Sand Fine Wet/Moist	2.00	146.00
Screen Material Type:	Hardpan Sandy	8.00	154.00
Slot: 60.00 in. Set Between 162.00 ft. and 177.00 ft.	Sand Medium To Coarse	6.00	160.00
Blank: 0.00 ft. Above	Gravel Medium To Coarse	5.00	165.00
Fittings:	Gravel Wet/Moist	7.00	172.00
None	Blue Clay	5.00	177.00
Well Grouted: Yes			
Grouting Method: Unknown			
No. of Bags:			
Additives: None			
Grouting Materials:			
Unknown			
Well Head Completion:			
Unknown			
Nearest source of possible contamination:			
Type			
Unknown			
Distance			
0.00 ft.			
Direction			
Unknown			
Drilling Machine Operator Name:			
Employment: Unknown			

(Continued on Page 2)



WATER WELL AND PUMP RECORD

Completion is required under authority of Part 127 Act 368 PA 1978.

Well ID: 63000004822

Failure to comply is a misdemeanor.

Import ID: 63037710302

Tax No:		Permit No:		County: Oakland		Township: Highland	
Well ID: 63000004822 Elevation: 1030 ft Latitude: 42.678056 Longitude: -83.611944		Fraction: U 1/4 U 1/4		Section: 10		Town/Range: 03N 07E	
		French Claim:		WSSN: 3312			
		Distance and Direction from Road Intersection: old WSSN 00835; 1200FT S OF MILFORD RD 820FT W OF HARVEY LK NE Highland Township Water Authority WSSN 3312					
		Well Name: Bretton Oaks Well #2					
Well Owner: Oakland Co Drain Commission							
Well Address: BRETTON OAKS SUB WELL#2 HIGHLAND TWP MI				Owner Address: WATERFORD MI			

Drilling Method: Unknown		Pump Installed: No		Pump Installation only:	
Well Depth: 174.00 ft.		Well Use: Type I public		HP:	
Well Type: Replacement		Date Completed: 3/13/1978		Pump Type:	
Casing Type: Unknown		Model Number:		Pump Capacity:	
Casing Joint: Unknown		Length of Drop Pipe:		Id of Well:	
Diameter: 12.00 in. to 152.50 ft. depth		Diameter of Drop Pipe:			
Bore Diameter 1:		Draw Down Seal Used:			
Bore Diameter 2:		Pressure Tank Installed: No			
Bore Diameter 3:		Pressure Tank Type:			
Height: 2.50 ft. above grade		Manufacturer:		Tank Capacity: Gallons	
Casing Fitting: None		Model Number:			
		Pressure Relief Valve Installed: No			
Static Water Level: 26.00 ft. Below Grade(Not Flowing)		Formation Description		Thickness	Depth to Bottom
Yield Test Method: Unknown		Yellow Sand & Gravel		15.00	15.00
Measurement Taken During Pump Test:		Yellow Sand Fine		5.00	20.00
100.00 ft. after 30.00 hrs. pumping at 1,002.00 GPM		Yellow Sand & Gravel		38.00	58.00
Abandoned Well Plugged: No		Clay		8.00	66.00
Reason for not plugging Well:		Gray Sand Fine Wet/Moist		7.00	73.00
Abandoned well ID:		Sand Gummy		7.00	80.00
Screen Installed: Yes		Hardpan		16.00	96.00
Well Intake:		Blue Clay		28.00	124.00
Filter Packed: No		Hardpan Sandy		21.00	145.00
Screen Diameter: 12.00 in.		Hardpan Gravelly		2.00	147.00
Length: 23.00 ft.		Gravel Coarse		20.00	167.00
Screen Material Type:		Sand & Gravel Coarse		6.00	173.00
Slot: 90.00 in. Set Between 151.00 ft. and 174.00 ft.		Gravel Coarse		3.00	176.00
Blank: 0.00 ft. Above					
Fittings:					
None					
Well Grouted: Yes		Geology Remarks: 1. [YELLOW SAND AND GRAVEL] [15] [15] 2. [FINE YELLOW SAND] [20] [5] 3. [YELLOW SAND AND GRAVEL] [58] [38] 4. [CLAY] [66] [8] 5. [GREY FINE SAND (WET)] [73] [7] 6. [PUTTY SAND] [80] [7] 7. [HARDPAN] [96] [16] 8. [BLUE CLAY] [124] [28] 9. [SANDY HARDPAN] [145] [21] 10. [GRAVELLY HARDPAN] [147] [2] 11. [COARSE GRAVEL] [167] [20] 12. [COARSE SAND TO LIGHT GRAVEL] [173] [6] 13. [COARSE GRAVEL] [176] [3]			
Grouting Method: Unknown					
No. of Bags:					
Additives: None					
Grouting Materials:					
Unknown					
Well Head Completion:					
Unknown					
Nearest source of possible contamination:		Contractor Type: Unknown			
Type		Registration Number: 25			
Distance		Business Name:			
Direction		Business Address:			
Unknown					
Unknown					
Drilling Machine Operator Name:		WATER WELL CONTRACTOR'S CERTIFICATION:			
Employment: Unknown		This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.			
		Signature of Registered Representative		Date	
General Remarks: ORIGINAL WELLID# WAS 63037710002; BOTTOM SLOT 8FT #35.					
OTHER REMARKS					

EQP 2017C (2/2000)

ATTENTION WELL OWNER: FILE WITH DEED

2/18/2000 10:45



WATER WELL AND PUMP RECORD

Completion is required under authority of Part 127 Act 368 PA 1978.

Well ID: 63000004997

Failure to comply is a misdemeanor.

Import ID: 63037711301

Tax No:		Permit No:		County: Oakland		Township: Highland	
Well ID: 63000004997 Elevation: 1034 ft Latitude: 42.671385 Longitude: -83.604162		Fraction: U ¼ U ¼ U ¼		Section: 11	Town/Range: 03N 07E	French Claim:	WSSN: 3312
		Distance and Direction from Road Intersection: old WSSN 00332; NE Highland Township Water Authority Wssn 3312					
		Well Name: Axford Acres Well #1					
		Well Owner: Oakland Co Drain Commission					
		Well Address: AXFORD ACRES/HERITAGE FARMS #1 HIGHLAND TWP MI				Owner Address: WATERFORD MI	

Drilling Method: Unknown		Pump Installed: No		Pump Installation only:		
Well Depth: 160.00 ft.	Well Use: Type I public	Pump Installation date:		HP:		
Well Type: Replacement	Date Completed: 1/23/1973	Manufacturer:		Pump Type:		
Casing Type: Unknown		Model Number:		Pump Capacity:		
Casing Joint: Unknown		Length of Drop Pipe:		Id of Well:		
Diameter: 6.00 in. to 145.50 ft. depth		Diameter of Drop Pipe:				
Bore Diameter 1:		Draw Down Seal Used:				
Bore Diameter 2:		Pressure Tank Installed: No				
Bore Diameter 3:		Pressure Tank Type:				
Height: 2.00 ft. above grade		Manufacturer:		Tank Capacity: Gallons		
Casing Fitting: None		Model Number:				
		Pressure Relief Valve Installed: No				
Static Water Level: 22.00 ft. Below Grade(Not Flowing)		Formation Description		Thickness	Depth to Bottom	
Yield Test Method: Unknown		Topsoil		1.00	1.00	
Measurement Taken During Pump Test:		Brown Sand & Gravel		39.00	40.00	
42.00 ft. after 8.00 hrs. pumping at 315.00 GPM		Gray Sand		5.00	45.00	
Abandoned Well Plugged: No		Sand Medium To Coarse		10.00	55.00	
Reason for not plugging Well:		Hardpan		31.00	86.00	
Abandoned well ID:		Blue Clay		44.00	130.00	
Screen Installed: Yes		Clay Gravelly		8.00	138.00	
Filter Packed: No		Sand Medium		5.00	143.00	
Screen Diameter: 6.00 in.		Gravel Coarse		12.00	155.00	
Length: 15.30 ft.		Gravel Medium To Coarse		5.00	160.00	
Screen Material Type:						
Slot: 80.00 in. Set Between 144.70 ft. and 160.00 ft.						
Blank: 0.00 ft. Above						
Fittings:						
None						
Well Grouted: Yes		Geology Remarks: 1. [TOP SOIL] [1] [1] 2. [BROWN SAND AND GRAVEL] [40] [39] 3. [GREY SAND] [45] [5] 4. [MEDIUM COARSE SAND] [55] [10] 5. [HARDPAN] [86] [31] 6. [BLUE CLAY] [130] [44] 7. [GRAVELLY CLAY] [138] [8] 8. [MEDIUM SAND] [143] [5] 9. [COARSE GRAVEL] [155] [12] 10. [MEDIUM COARSE GRAVEL] [160] [5]				
Grouting Method: Unknown						
No. of Bags:						
Additives: None						
Grouting Materials:						
Unknown						
Well Head Completion:						
Unknown						
Nearest source of possible contamination:		Contractor Type: Unknown				
Type		Registration Number: 25				
Distance		Business Name:				
Direction		Business Address:				
Unknown						
Unknown						
Drilling Machine Operator Name:		WATER WELL CONTRACTOR'S CERTIFICATION:				
Employment: Unknown		This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.				
		Signature of Registered Representative		Date		
General Remarks: ORIGINAL WELLID# WAS 63037711001; TOP SLOT 5FT 1IN #80; MIDDLE 5FT 1IN #80; BOTTOM 5FT 1IN #60.						
OTHER REMARKS						

EQP 2017C (2/2000)

ATTENTION WELL OWNER: FILE WITH DEED

2/18/2000 10:48



WATER WELL AND PUMP RECORD

Completion is required under authority of Part 127 Act 368 PA 1978.

Well ID: 63000004998

Failure to comply is a misdemeanor.

Import ID: 63037711302

Tax No:	Permit No:	County: Oakland	Township: Highland
Well ID: 63000004998		Fraction: U 1/4 U 1/4	Section: 11
Elevation: 1034 ft		Town/Range: 03N 07E	French Claim: WSSN: 3312
Latitude: 42.671389		Distance and Direction from Road Intersection: old WSSN 00332; NE Highland Township Water Authority	
Longitude: -83.604167		Well Name: axford Acres Well #2	
		Well Owner: Oakland Co Drain Commission	
		Well Address: AXFORD ACRES/HERITAGE FARMS #2 HIGHLAND TWP MI	Owner Address: WATERFORD MI

Drilling Method: Unknown	Pump Installed: No	Pump Installation only:
Well Depth: 167.00 ft.	Well Use: Type I public	Pump Installation date:
Well Type: Replacement	Date Completed: 5/23/1973	Manufacturer:
Casing Type: Unknown		Model Number:
Casing Joint: Unknown		Length of Drop Pipe:
Diameter: 12.00 in. to 126.40 ft. depth		Diameter of Drop Pipe:
		Draw Down Seal Used:
Bore Diameter 1:		Pressure Tank Installed: No
Bore Diameter 2:		Pressure Tank Type:
Bore Diameter 3:		Manufacturer:
Height: 2.00 ft. above grade		Model Number :
Casing Fitting: None		Tank Capacity : Gallons
		Pressure Relief Valve Installed : No
Static Water Level: 22.00 ft. Below Grade(Not Flowing)		
Yield Test Method: Unknown		
Measurement Taken During Pump Test:		
0.00 ft. after 0.00 hrs. pumping at 1,012.00 GPM		
Abandoned Well Plugged: No		
Reason for not plugging Well:		
Abandoned well ID:		
Screen Installed: Yes	Well Intake:	
Filter Packed: No		
Screen Diameter: 12.00 in.	Length: 17.90 ft.	
Screen Material Type:		
Slot: 12.00 in. Set Between 149.10 ft. and 167.00 ft.		
Blank: 0.00 ft. Above		
Fittings:		
Neoprene packer		
Well Grouted: Yes	Grouting Method: Unknown	
No. of Bags:	Additives: None	
Grouting Materials:		
Unknown		
Well Head Completion:	Unknown	
Nearest source of possible contamination:		
Type	Distance Direction	
Unknown	0.00 ft.	
Unknown		
Drilling Machine Operator Name:		
Employment: Unknown		
		Contractor Type: Unknown
		Registration Number: 25
		Business Name:
		Business Address:
		WATER WELL CONTRACTOR'S CERTIFICATION:
		This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.
		Signature of Registered Representative Date
General Remarks: ORIGINAL WELLID# WAS 63037711002; MIDDLE SLOT 3FT#80;BOTTOM 4FT7IN#35.		
OTHER REMARKS		

EQP 2017C (2/2000)

ATTENTION WELL OWNER: FILE WITH DEED

2/18/2000 10:48



WATER WELL AND PUMP RECORD

Completion is required under authority of Part 127 Act 368 PA 1978.

Well ID: 63000005301

Failure to comply is a misdemeanor.

Import ID: 63037714301

Tax No:		Permit No:		County: Oakland		Township: Highland	
Well ID: 63000005301 Elevation: 1031 ft Latitude: 42.661667 Longitude: -83.591111		Fraction: SE ¼ SE ¼ NE ¼		Section: 14	Town/Range: 03N 07E	French Claim:	WSSN: 3312
		Distance and Direction from Road Intersection: old WSSN# 00332; 3/4 MI E OFF HARVEY LK ON WARDLOW N SIDE NE Highland Township Water Authority WSSN 3312					
		Well Name: South Bay Shores #1					
		Well Owner: Oakland Co Drain Commission					
Well Address: SOUTH BAY SHORES HIGHLAND TWP MI				Owner Address: WATERFORD TWP MI			

Drilling Method: Rotary		Pump Installed: No		Pump Installation only:	
Well Depth: 100.00 ft.		Well Use: Type I public		Pump Installation date:	
Well Type: New		Date Completed: 5/23/1994		Manufacturer:	
Casing Type: Steel - black		Model Number:		Pump Type:	
Casing Joint: Unknown				Pump Capacity:	
Diameter: 20.00 in. to 20.00 ft. depth				Id of Well:	
12.00 in. to 60.00 ft. depth					
Bore Diameter 1: 17.50 in. to 60.00 ft. depth		Pressure Tank Installed: No			
Bore Diameter 2:		Pressure Tank Type:			
Bore Diameter 3:		Manufacturer:			
Height: 4.00 ft. above grade		Model Number :			
Casing Fitting: None		Tank Capacity : Gallons			
Static Water Level: 25.28 ft. Below Grade(Not Flowing)		Pressure Relief Valve Installed : No			
Yield Test Method: Unknown					
Measurement Taken During Pump Test:					
49.00 ft. after 72.00 hrs. pumping at 201.00 GPM					
Abandoned Well Plugged: No					
Reason for not plugging Well:					
Abandoned well ID:					
Screen Installed: Yes		Well Intake:			
Filter Packed: No					
Screen Diameter: 10.00 in.		Length: 32.00 ft.			
Screen Material Type:					
Slot: 0.01 in. Set Between 68.00 ft. and 100.00 ft.					
Blank: 0.00 ft. Above					
Fittings:					
Neoprene packer					
Well Grouted: Yes		Grouting Method: Unknown			
No. of Bags:		Additives: None			
Grouting Materials:					
Neat cement		From 0.00 ft. to 60.00 ft.			
Well Head Completion:		12 inches above grade, Other			
Nearest source of possible contamination:		Contractor Type: Unknown			
Type		Registration Number: 2072			
Unknown		Business Name:			
Unknown		Business Address:			
Drilling Machine Operator Name:		WATER WELL CONTRACTOR'S CERTIFICATION:			
Employment: Unknown		This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.			
		Signature of Registered Representative			
		Date			
General Remarks: THIS WELL IS KNOWN AS AXFORD ACRES/HERITAGE FARMS WELL #3; THE SCREEN IS 12 AT BOTTOM AND 30 AT THE TOP; THE SCREEN IS ALSO BLANK ABOVE SCREEN 11 FT; AIR WAS USED TO DETERMINE PUMPING LEVEL; THE GROUT USED 65 BAGS OF CEMENT					
OTHER REMARKS Well Head Completion: 12 inch Above Grade					

EQP 2017C (2/2000)

ATTENTION WELL OWNER: FILE WITH DEED

2/18/2000 10:53



WATER WELL AND PUMP RECORD

Completion is required under authority of Part 127 Act 368 PA 1978.

Well ID: 63000017143

Failure to comply is a misdemeanor.

Tax No:	Permit No:	County: Oakland	Township: Highland
Well ID: 63000017143		Fraction: SE¼ SE¼ SW¼	Section: 13
Elevation: 1033 ft		Town/Range: 03N 07E	French Claim: WSSN: 3312
Latitude: 42.654624		Distance and Direction from Road Intersection: WSSN 3312; NE Highland Township Water Authority for Huntwood Place Subdivision	
Longitude: -83.574779		Well Name: Huntwood Place Well #1	
		Well Owner: Ocde	
		Well Address: Huntwood Place Well #1 Highland MI	Owner Address: Waterford MI

Drilling Method: Cable tool	Pump Installed: No	Pump Installation only:
Well Depth: 174.00 ft.	Pump Installation date:	HP:
Well Use: Type I public	Manufacturer:	Pump Type:
Well Type: New	Model Number:	Pump Capacity:
Date Completed: 5/29 1996	Length of Drop Pipe:	Id of Well:
Casing Type: Unknown	Diameter of Drop Pipe:	
Casing Joint: Unknown	Draw Down Seal Used:	
Diameter: 20.00 in. to 80.00 ft. depth 12.00 in. to 153.00 ft. depth	Pressure Tank Installed: No	
Bore Diameter 1: 17.00 in. to 155.00 ft. depth	Pressure Tank Type:	
Bore Diameter 2:	Manufacturer:	
Bore Diameter 3:	Model Number:	Tank Capacity: Gallons
Height: 8.00 ft. above grade	Pressure Relief Valve Installed: No	
Casing Fitting: Unknown		
Static Water Level: 23.92 ft. Below Grade(Not Flowing)	Formation Description	Thickness
Yield Test Method: Air		Depth to Bottom
Measurement Taken During Pump Test:	Sand & Gravel Coarse	15.00
86.80 ft. after 72.00 hrs. pumping at 550.00 GPM	Sand Medium Fine	12.00
	Gray Clay	9.00
Abandoned Well Plugged: No	Sand & Gravel	29.00
Reason for not plugging Well:	Granite Coarse	3.00
Abandoned well ID:	Gray Clay & Gravel	44.00
Screen Installed: Yes	Sand & Gravel Medium Coarse	1.00
Well Intake:	Gray Clay & Gravel	34.00
Filter Packed: No	Sand & Gravel Coarse	28.00
Screen Diameter: 10.00 in.		
Length: 20.00 ft.		
Screen Material Type: Stainless steel-wire wrapped		
Slot: 80.00 in. Set Between 154.00 ft. and 174.00 ft.		
Blank: 12.00 ft. Above		
Fittings:		
Blank above screen		
Well Grouted: Yes	Grouting Method: Unknown	
No. of Bags: 200	Additives: None	
Grouting Materials:		
Neat cement	From 0.00 ft. to 153.00 ft.	
Well Head Completion:		
12 inches above grade		
Nearest source of possible contamination:	Contractor Type: Water well drilling contractor	
Type	Registration Number: 2072	
Unknown	Business Name: Brown Drilling	
Unknown	Business Address:	
Drilling Machine Operator Name: Jay Addy	WATER WELL CONTRACTOR'S CERTIFICATION:	
Employment: Employee	This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.	
	Signature of Registered Representative	Date
General Remarks:		
OTHER REMARKS		

EQP 2017C (2/2000)

ATTENTION WELL OWNER: FILE WITH DEED

3/31/2003 15:34



WATER WELL AND PUMP RECORD

Completion is required under authority of Part 127 Act 368 PA 1978.

Well ID: 63000017144

Failure to comply is a misdemeanor.

Tax No:	Permit No:	County: Oakland	Township: Highland
Well ID: 63000017144		Fraction: SE¼ SE¼ SW¼	Section: 13
Elevation: 1033 ft		Town/Range: 03N 07E	French Claim: WSSN: 3312
Latitude: 42.654521		Distance and Direction from Road Intersection: WSSN 3312; NE Highland Water Authority Huntwood Place Subdivision Well #2	
Longitude: -83.575017		Well Name: Huntwood Place Well #2	
		Well Owner: Ocdc	
		Well Address: Huntwood Place Well #2 Highland MI	Owner Address: Waterford MI

Drilling Method: Cable tool	Pump Installed: No	Pump Installation only:
Well Depth: 175.00 ft.	Well Use: Type I public	HP:
Well Type: New	Date Completed: 11/12/1996	Pump Type:
Casing Type: Unknown		Pump Capacity:
Casing Joint: Unknown		Id of Well:
Diameter: 14.00 in. to 80.00 ft. depth 8.00 in. to 155.00 ft. depth	Manufacturer:	
	Model Number:	
	Length of Drop Pipe:	
	Diameter of Drop Pipe:	
	Draw Down Seal Used:	
Bore Diameter 1: 12.00 in. to 155.00 ft. depth	Pressure Tank Installed: No	
Bore Diameter 2: 8.00 in. to 175.00 ft. depth	Pressure Tank Type:	
Bore Diameter 3:	Manufacturer:	
Height:	Model Number :	Tank Capacity : Gallons
Casing Fitting: Unknown	Pressure Relief Valve Installed : No	
Static Water Level: 23.50 ft. Below Grade(Not Flowing)	Formation Description	Thickness
Yield Test Method: Test pump		Depth to Bottom
Measurement Taken During Pump Test:	Sand & Gravel Coarse	15.00
87.90 ft. after 24.00 hrs. pumping at 500.00 GPM	Sand Medium	12.00
	Gray Clay	9.00
	Sand & Gravel	29.00
	Sand Coarse	3.00
Abandoned Well Plugged: No	Gray Clay & Gravel	67.00
Reason for not plugging Well:	Clay & Gravel	12.00
Abandoned well ID:	Gravel W/Clay	4.00
Screen Installed: Yes	Sand & Gravel Medium	21.00
Filter Packed: No	Sand & Gravel	8.00
Screen Diameter: 6.00 in.	Gray Sand Medium	15.00
Length: 20.00 ft.	Gray Clay	5.00
Screen Material Type: Stainless steel-wire wrapped		
Slot: 80.00 in. Set Between 155.00 ft. and 175.00 ft.		
Blank: 6.00 ft. Above		
Fittings:		
Blank above screen		
Well Grouted: Yes	Geology Remarks:	
Grouting Method: Unknown		
No. of Bags: 105		
Additives: None		
Grouting Materials:		
Neat cement		
Well Head Completion: 12 inches above grade		
Nearest source of possible contamination:	Contractor Type: Water well drilling contractor	
Type	Registration Number: 28	
Distance	Business Name: Brown Drilling	
Direction	Business Address:	
None		
Drilling Machine Operator Name: Brent Kerron	WATER WELL CONTRACTOR'S CERTIFICATION:	
Employment: Employee	This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.	
	Signature of Registered Representative	Date
General Remarks:		
OTHER REMARKS		

ATTACHMENT 3


DEED RESTRICTION AND LEGAL DESCRIPTION OF PROPERTY

DEC 22 1993

DEED RESTRICTIONS ON HI-MILL MANUFACTURING CO. SITE

Hi-Mill Manufacturing Company, owner in fee simple of the real estate described in Attachment 1, hereby imposes restrictions on the described real estate, also known as the Hi-Mill Manufacturing Company Site (hereinafter "the Site") in Highland, Oakland County, State of Michigan.

The following restrictions are imposed upon the Site, its present and any future owners, their authorized agents, assigns, employees or persons acting under their direction or control, for the purposes of protecting public health or welfare and the environment, preventing interference with the performance, and the maintenance, of any response actions selected and/or undertaken by the United States Environmental Protection Agency ("U.S. EPA"), or any party acting as agent for U.S. EPA, pursuant to Section 104 of the Comprehensive Environmental Response, Compensation, and Liability Act ("CERCLA"). Specifically, the following deed restrictions shall apply to the Site as provided for in paragraph nine (9) of the Consent Decree:

- 
1. There shall be no consumptive or other use of the shallow groundwater unit underlying the Site that could cause exposure of humans or animals to the shallow groundwater unit underlying the Site;
 2. There shall be no residential or agricultural use of the Site, including, but not limited to, any installation of drinking water production wells in the shallow groundwater unit, except as approved by U.S. EPA. Further, there shall be no excavation beneath the paved parking areas at the Site.
 3. There shall be no tampering with, or removal of, the containment or monitoring systems that remain on the Site as a result of implementation of any response action by U.S. EPA, or any party acting as agent for U.S. EPA, and which is selected and/or undertaken by U.S. EPA pursuant to Section 104 of CERCLA; and
 4. There shall be no use of, or activity at, the Site that may interfere with, damage, or otherwise impair the effectiveness of any response action (or component thereof) selected and/or undertaken by U.S. EPA, pursuant to Section 104 of CERCLA, except with written approval of U.S. EPA, and consistent with all statutory and regulatory requirements.

The above use restrictions are intended for the protection of public health and the environment and may therefore be enforced by the U.S. EPA or the State of Michigan. The obligation to implement and maintain the above restrictions shall run with the land and shall remain in effect permanently,

O.K. - J.S.

\$ 11.00 MISCELLANEOUS RECORDING
\$ 2.00 REMONUMENTATION
22 DEC 94 1:14 P.M.
RECEIPT# 1328
PAID
RECORDED
LYNN D. ALLEN, CLERK/REGISTER OF DEEDS
OAKLAND COUNTY

11/80
x 200

unless and until such time as U.S. EPA determines there is no longer contamination on the Site.

IN WITNESS WHEREOF, Robert Beard has caused these Deed Restrictions to be executed this 22nd day of December, 1994.

FOR HI-MILL MANUFACTURING COMPANY

BY: Robert F. Beard
Robert F. Beard

Witnesseth:

Denise Russette
WITNESS Denise Russette

Clair J. Kelley
WITNESS CLAIR J. KELLEY

STATE OF MICHIGAN
COUNTY OF MACOMB

Subscribed and sworn to before me this 22nd Day of December, 1994 by Robert F. Beard

Denise M. Russette
Denise M. Russette
Macomb County, Michigan
my Commission expires 5/26/96

Drafted by and when recorded
return to:

Butzel Long
By Richard Beard
Robert Beard
150 W. Jefferson
Detroit, MI 48206-4430
ATTN: DENISE Russette

LEGAL DESCRIPTION

Town 3 North, Range 7 East, Section 23

That part of the Southwest 1/4 of the Northwest 1/4 of the Northeast 1/4 of Section lying Southeasterly of M-59 highway, Also that part of Southwest 1/4 of Northeast 1/4 of Section described as beginning at intersection of North line of Southwest 1/4 of Northeast 1/4 with Southeasterly right of way line of M-59 Highway, thence South 40 degrees 51 minutes 18 seconds West 100 feet, thence South 49 degrees 8 minutes 42 seconds East 250 feet, thence North 40 degrees 51 minutes 18 seconds East 305 feet, thence West along North line of Southwest 1/4 of Northeast 1/4 to beginning.

HIGHLAND
11-23-202-003 NE 1/4

ATTACHMENT 4
DOCUMENTS REVIEWED

ATTACHMENT 4

DOCUMENTS REVIEWED

Operation and Maintenance Reports, Conestoga Rovers & Associates, 1997 through 2005

Eight-Year Evaluation Report, Conestoga Rovers & Associates, November 11, 2003

Final Remedial Investigation Report, Hi-Mill Manufacturing Site, Geraghty & Miller, Inc., March 5, 1993

Final Response Design Plan, Hi-Mill Manufacturing Site, Conestoga Rovers & Associates, March 21, 1995

Record of Decision, Hi-Mill Manufacturing Site, USEPA, September 28, 1993

First Five-Year Review Report, Hi-Mill Manufacturing Site, August 25, 2000

Revised Final Construction Report, Conestoga Rovers & Associates, January 1996

History of TCE Usage at the Hi-Mill Manufacturing Company Superfund Site, letter to USEPA from Robert F. Beard, President, Hi-Mill Manufacturing Company, March 4, 1998

GORE-SORBER Soil Gas Screening Survey Results, Hi-Mill Manufacturing Site, Conestoga Rovers & Associates, June 22, 2000

Source Area Treatment Work Plan, Conestoga Rovers & Associates, July 28, 2000

Source Area Treatment Interim Report, Conestoga Rovers & Associates, January 15, 2001

Source Area Treatment Final Report, Conestoga Rovers & Associates, August 18, 2003

Drinking Water Chemistry Database, Michigan Department of Environmental Quality, Drinking Water Program, 1988 through 2005

Sanitary Sewer Master Plan for Highland Township, Hubbell, Roth & Clark, Inc., April 2004

Highland Township 1999 Master Land Use Plan Map, Donnellon Swarthout & Associates, adopted July 6, 2000

Charter Township of Highland Zoning Map, Carlisle/Wortman & Associates, March 2005

Water Supply Systems Plan, Highland Township, Oakland County, Michigan, Powell & Associates, not dated

Wellhead Protection Program Map, Preliminary Environmental Sources of Concern, Highland Township, Oakland County Drain Commissioner, 1995





Consumer Confidence Reports, Highland Township Well Water Supply Systems, Oakland County Drain Commissioner, 2003 and 2004

U.S. Census Bureau, Community Profile for Highland Township, 2000

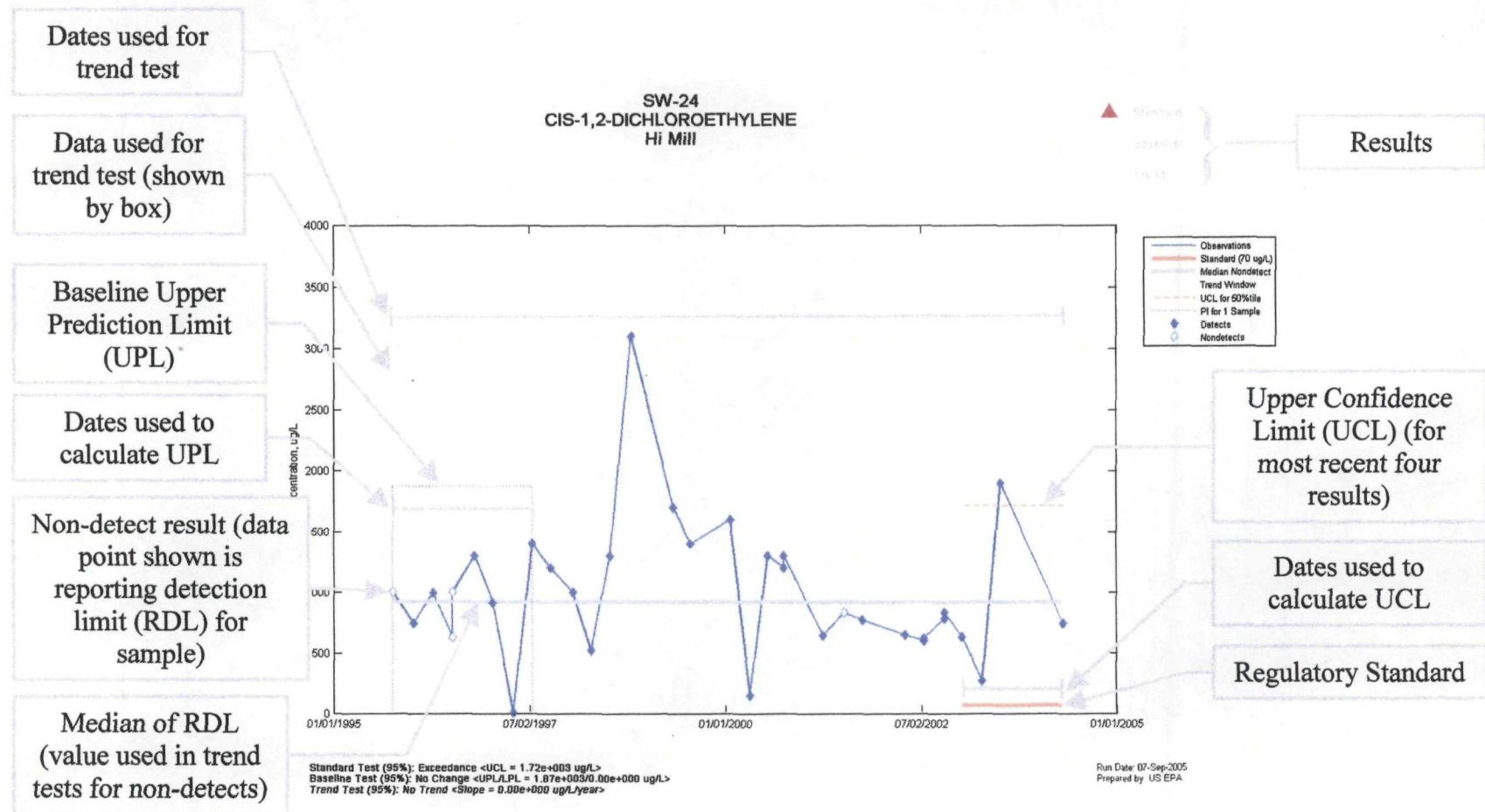
ATTACHMENT 5

PRELIMINARY RESULTS OF TREND ANALYSES

The meaning of each glyph depends on the statistical test, as described in the table below.

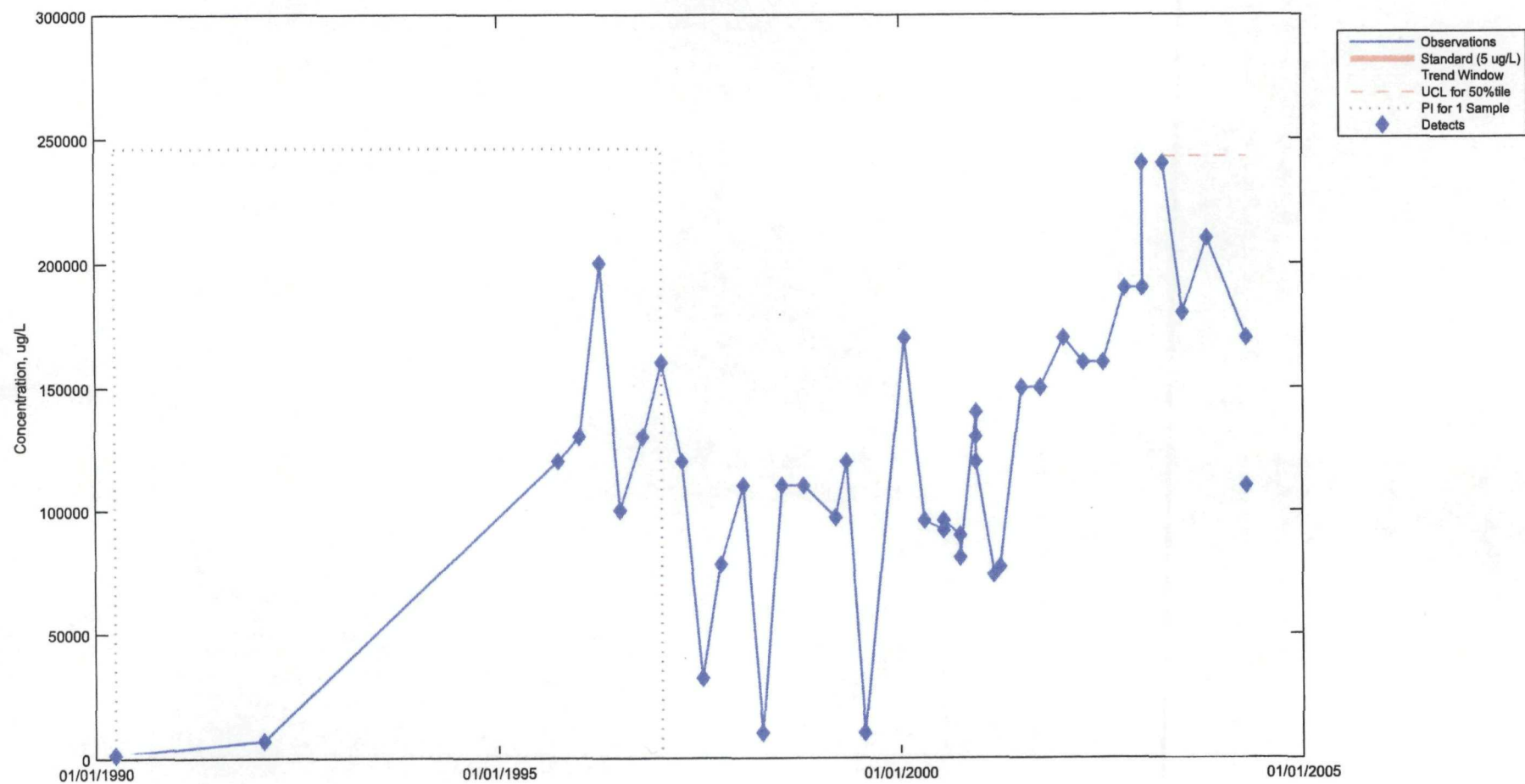
<i>Glyph</i>	<i>Trend Test</i>	<i>Comparison to Standard Test</i>	<i>Comparison to Baseline Test</i>
	Increasing trend	UCL exceeds pertinent standard	Latest datum exceeds UPL of baseline period
	Decreasing trend	UCL is less than pertinent standard	Latest datum less than LPL of baseline period
	Not used for H-Mill	All included data were nondetects and reporting detection limit exceeds pertinent standard	Latest datum is nondetect.
	No trend OR no report (e.g., insufficient data)	No exceedance or compliance OR no report	No change OR no report
Acronyms: UCL = upper confidence limit UPL = upper prediction limit LPL = lower prediction limit			

Interpreting Charts from Plume Assessment Metrics (PAM) Software



**SW-1
TRICHLOROETHYLENE (TCE)
Hi Mill**

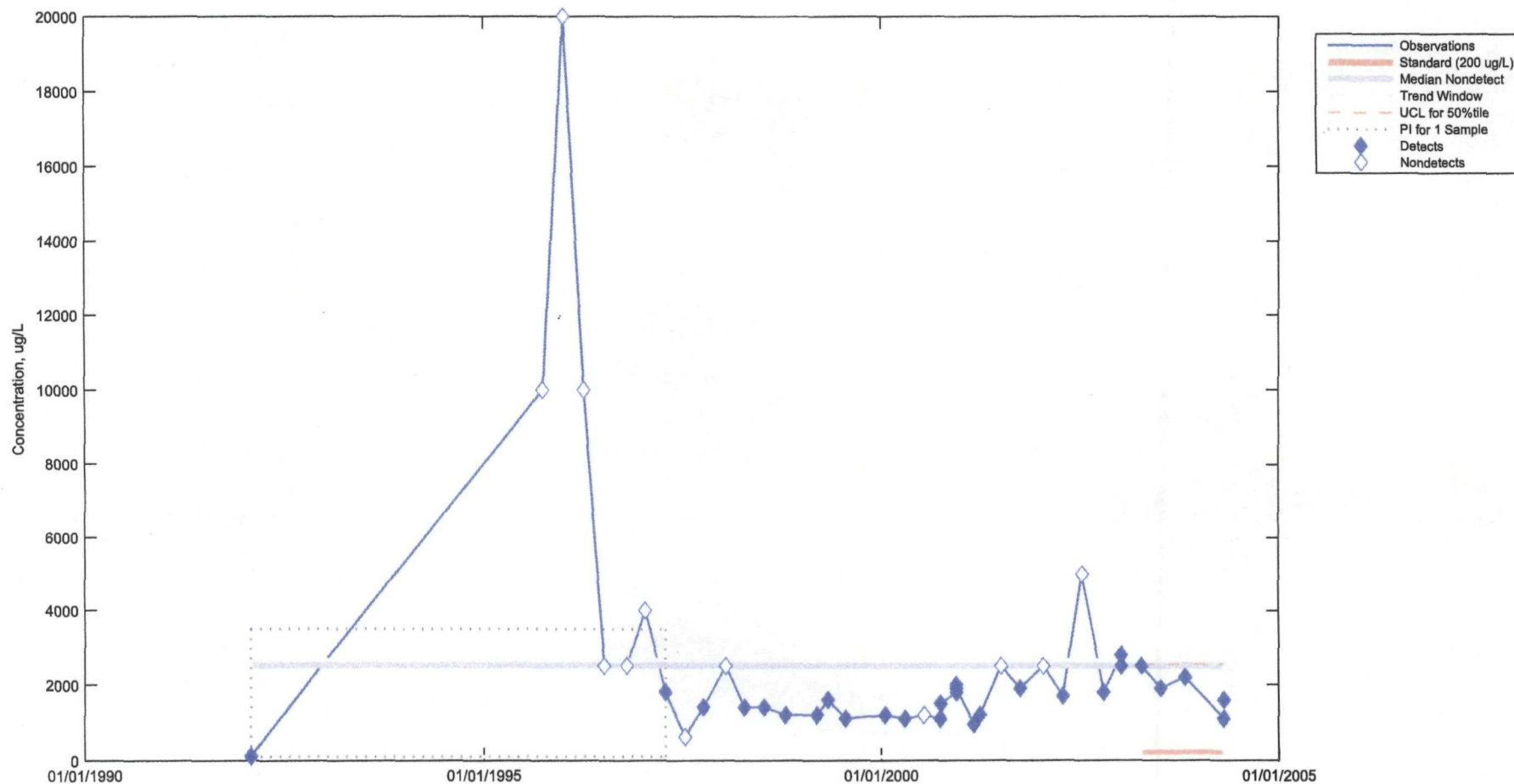
Standard
Baseline
Trend



Standard Test (95%): Exceedance <UCL = 2.43e+005 ug/L>
Baseline Test (95%): No Change <UPL/LPL = 2.46e+005/0.00e+000 ug/L>
Trend Test (95%): Upward <Slope = 1.19e+004 ug/L/year>

Run Date: 13-Sep-2005
Prepared by: US EPA

**SW-1
1,1,1-TRICHLOROETHANE
Hi Mill**

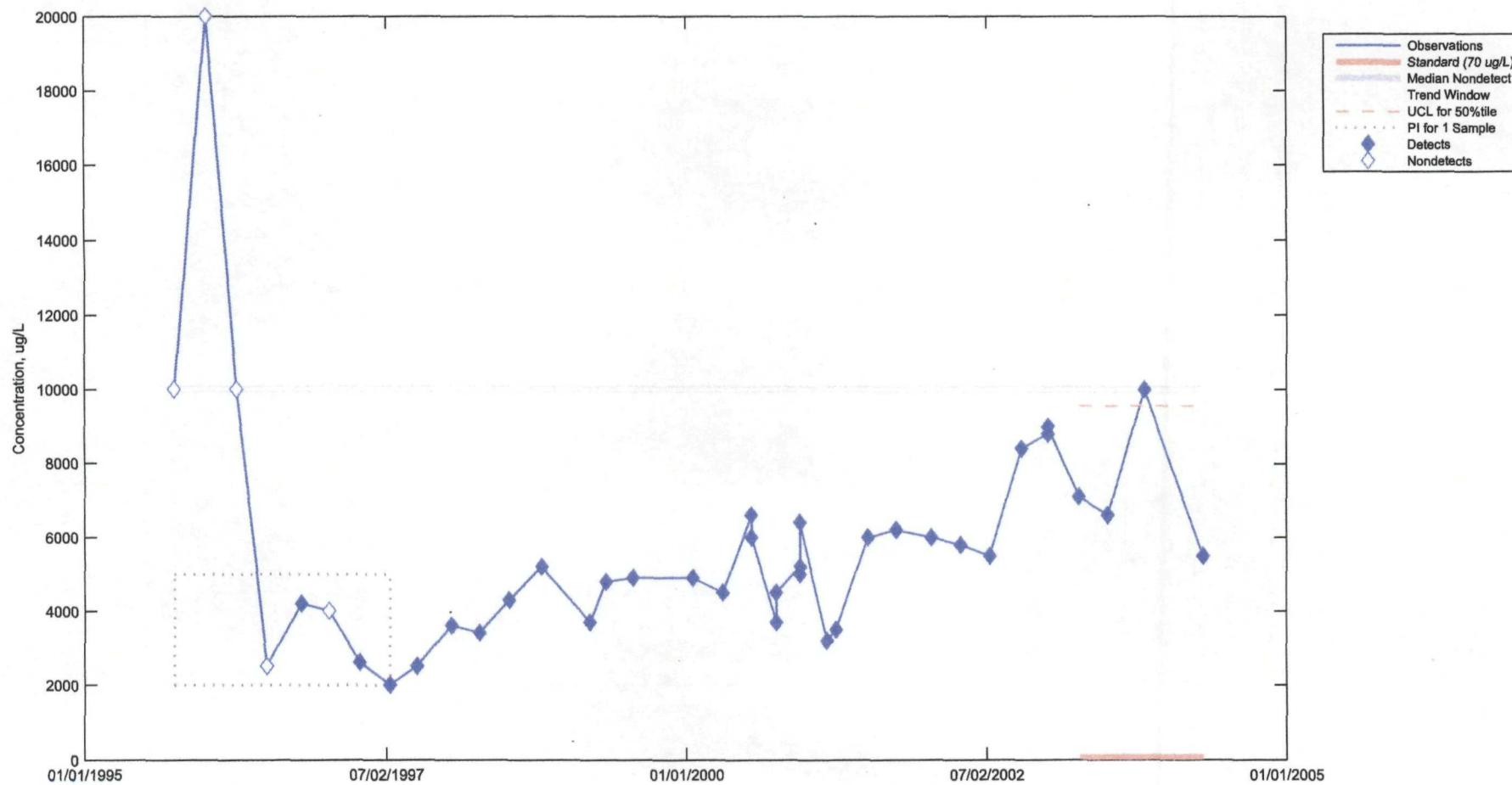


Standard Test (95%): Exceedance <UCL = 2.56e+003 ug/L>
 Baseline Test (95%): No Change <UPL/LPL = 3.50e+003/1.00e+002 ug/L>
 Trend Test (95%): No Trend <Slope = 5.93e+001 ug/L/year>

Run Date: 13-Sep-2005
 Prepared by: US EPA

**SW-1
CIS-1,2-DICHLOROETHYLENE
Hi Mill**

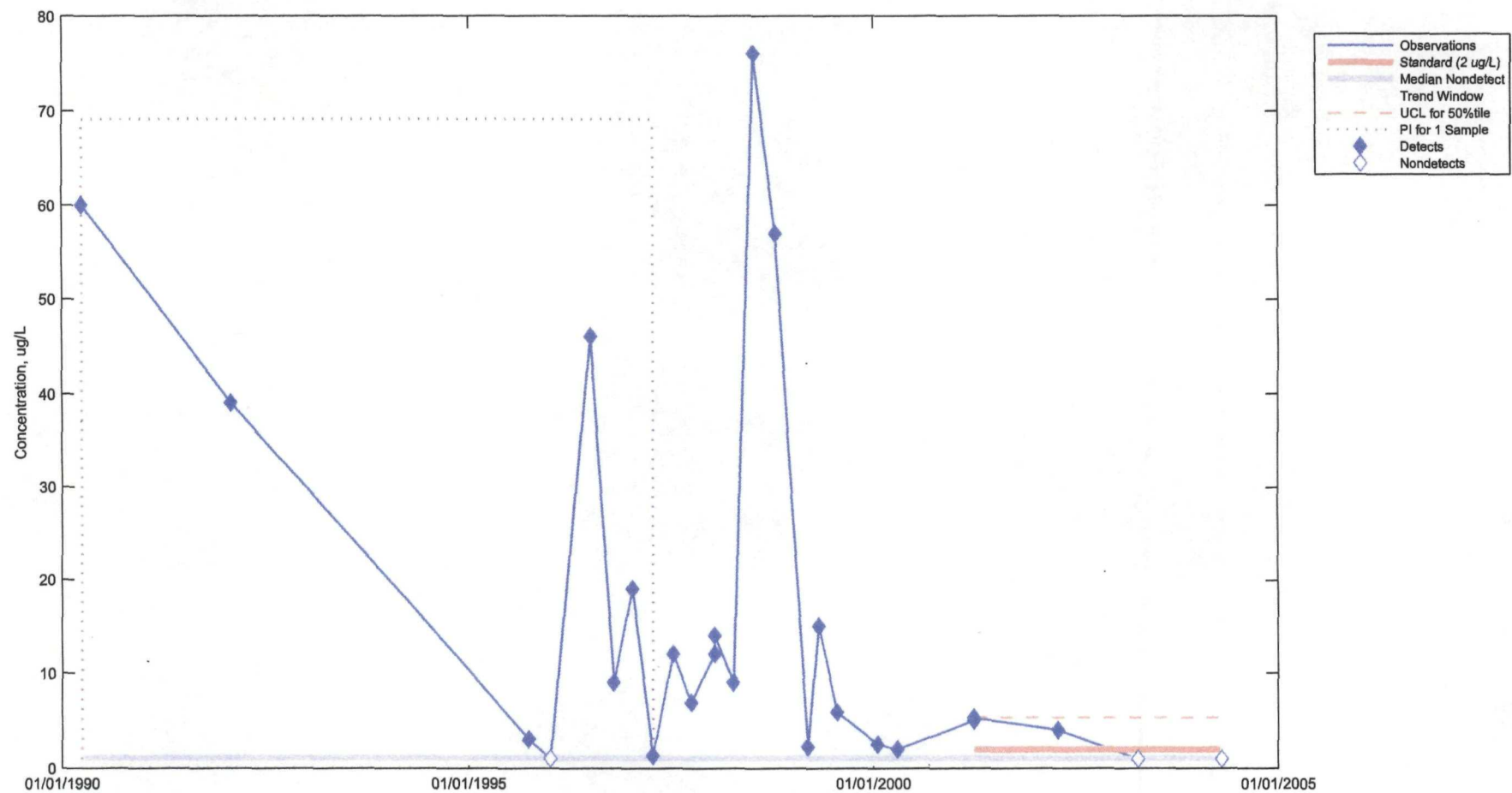
Standard
Baseline
Trend



Standard Test (95%): Exceedance <UCL = 9.56e+003 ug/L>
Baseline Test (95%): Worse <UPL/LPL = 5.00e+003/2.00e+003 ug/L>
Trend Test (95%): Upward <Slope = 3.93e+002 ug/L/year>

Run Date: 13-Sep-2005
Prepared by: US EPA

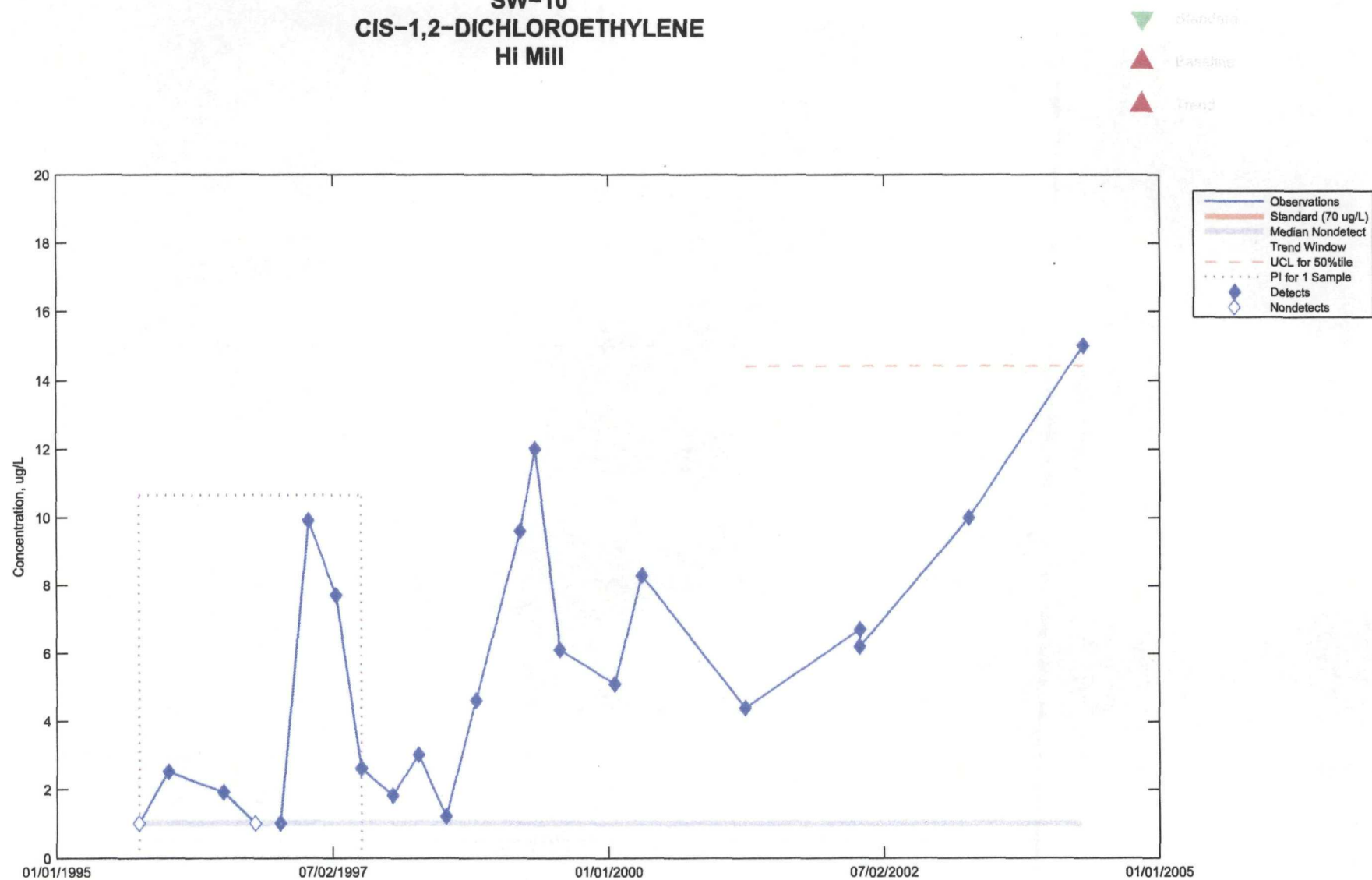
**SW-3
VINYL CHLORIDE
Hi Mill**



Standard Test (95%): Exceedance <UCL = 5.36e+000 ug/L>
 Baseline Test (95%): No Change <UPL/LPL = 6.91e+001/0.00e+000 ug/L>
 Trend Test (95%): Downward <Slope = -1.92e+000 ug/L/year>

Run Date: 13-Sep-2005
 Prepared by: US EPA

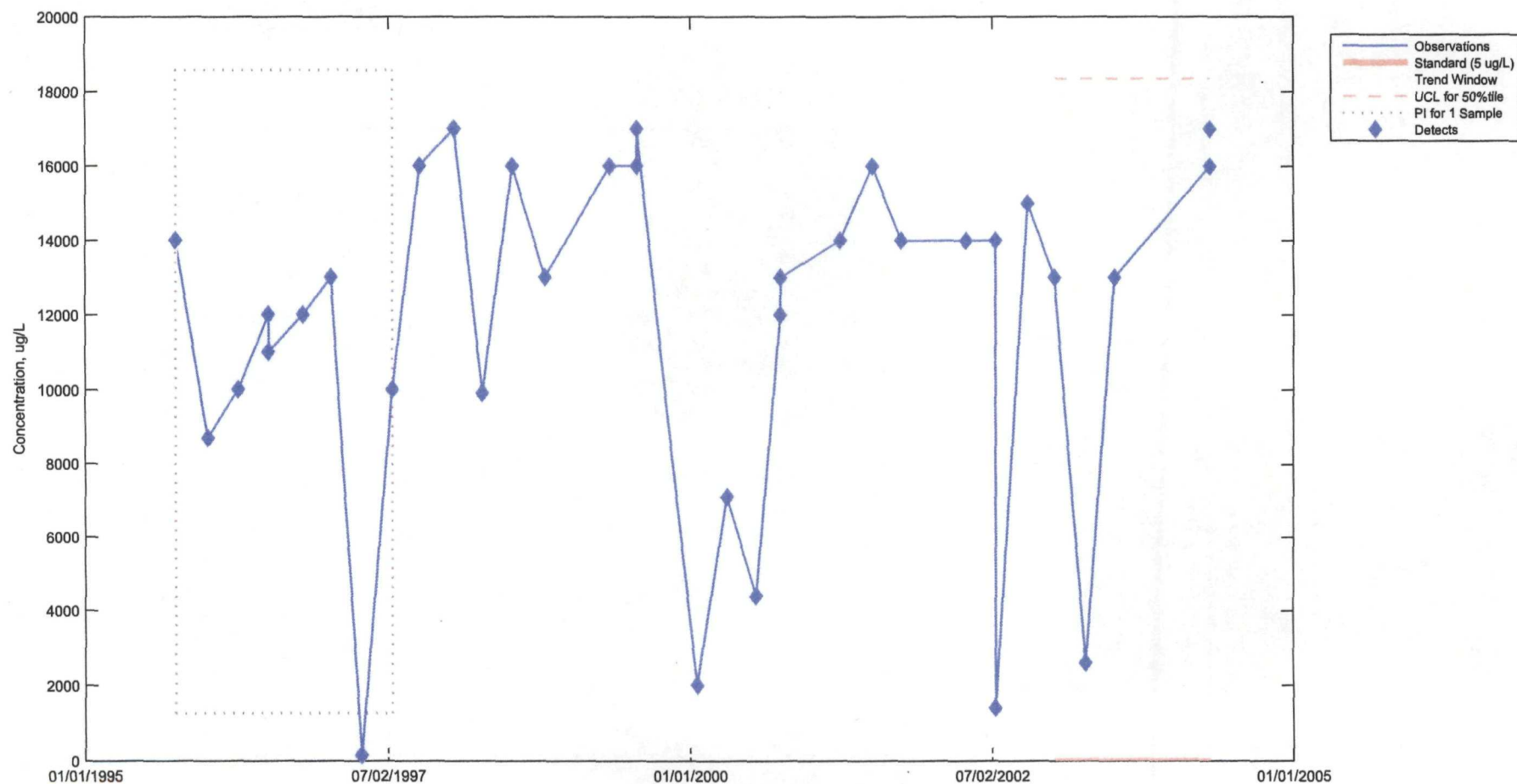
**SW-10
CIS-1,2-DICHLOROETHYLENE
Hi Mill**



Standard Test (95%): Compliance <UCL = 1.44e+001 ug/L>
 Baseline Test (95%): Worse <UPL/LPL = 1.07e+001/0.00e+000 ug/L>
 Trend Test (95%): Upward <Slope = 1.16e+000 ug/L/year>

Run Date: 13-Sep-2005
 Prepared by: US EPA

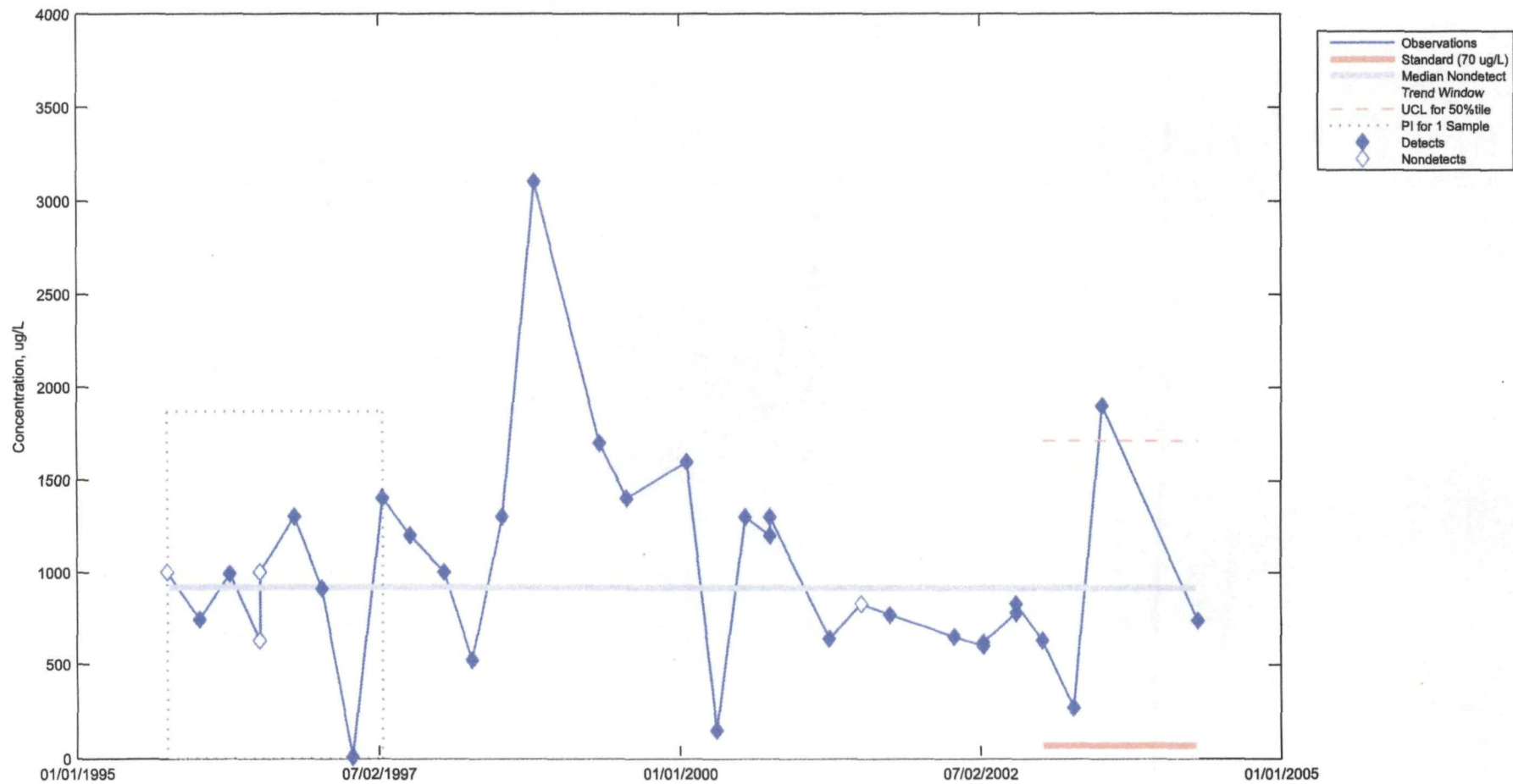
**SW-24
TRICHLOROETHYLENE (TCE)
Hi Mill**



Standard Test (95%): Exceedance <UCL = 1.84e+004 ug/L>
 Baseline Test (95%): No Change <UPL/LPL = 1.86e+004/1.25e+003 ug/L>
 Trend Test (95%): No Trend <Slope = 2.01e+002 ug/L/year>

Run Date: 13-Sep-2005
 Prepared by: US EPA

**SW-24
CIS-1,2-DICHLOROETHYLENE
Hi Mill**



Standard Test (95%): Exceedance <UCL = 1.72e+003 ug/L>
 Baseline Test (95%): No Change <UPL/LPL = 1.87e+003/0.00e+000 ug/L>
 Trend Test (95%): No Trend <Slope = -2.82e+000 ug/L/year>

Run Date: 13-Sep-2005
 Prepared by: US EPA

ATTACHMENT 6

SITE INSPECTION NOTES ON MONITORING WELLS

47

HI-MILL MANUFACTURING SITE

June 22, 2005

	Secured/Locked	Functioning	Routinely Sampled	Good Condition	Needs Maintenance
SW-1	YES	Dedicated tubing	Q	Old tank concrete to N, 10'	No cap
SW-2	YES				no cap
SW-3	YES				PVC no cap
SW-4	YES				no caps
SW-6	YES - ^{west of} old brick table			in brush	Does have No cap
SW-9A	Yes - new lock			Loose	No cap
SW-10	Yes - new lock	Dedicated tubing			Can't tell
SW-11					No cap
SW-12	YES				No cap
SW-14	YES - ^{new} lock	square			Can't tell
SW-23	iron cap not screwed down	YES		Water in well	OK - seal is good

you are locked well next door?

SW-21 - upheaved well locked

SW-5 - capped = not used

Found flush top for T.J./mm

HI-MILL MANUFACTURING SITE

June 22, 2005

	Secured/Locked	Functioning	Routinely Sampled	Good Condition	Needs Maintenance
SW-24	Iron cap	directly across from pole	Q	is sometimes flooded	
SW-25	OKay				no cap (Bill)
SW-26A	Iron cap no well locked		S	flush mount	
SW-27	Yes new stand pipe		S		Can't tell ab cap
SW-28	Yes		S		can't tell
IW-1	Yes				Can't see cap
IW-2					r
IW-3	YES				pvc no cap
IW-4A	YES				No cap
IW5	Yes - new square pole				Can't tell
IW-8	yes				can't tell
IW-9	yes - new stand pipe				No cap

HI-MILL MANUFACTURING SITE

June 22, 2005

	Secured/Locked	Functioning	Routinely Sampled	Good Condition	Needs Maintenance
SW-15					
SW-21					
P9					
P10					
P11B					
P12	No metal cap				
P13B	Iron cap off				
SG-1				Beut at bottom	
SG-2					
SG-3	X				
SG-4					

cap
ground once
push well
locked
NLO

Also "MW3 - injection (mounting) [other MW2 - labeled for injection 5/24/05]
Also - one in pkg 6/17
FJ2 near SW-1
IS-#400 = east of SW1
SW22 = betw
moving 10 ft 9A
new lock

ATTACHMENT 7

APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS

ATTACHMENT 7

Applicable or Relevant and Appropriate Requirements (ARARs)

Chemical Specific

- Clean Air Act (CAA) 40 CFR 50.1-6,8,9,11 and 12.
- Michigan Environmental Response act 307 (1982), MCL 299.601 R 299.5101, Type "C" cleanup. Under the MDNR's reading of Act 307, this ROD is to be considered an Act 307 interim remedy, as allowed by R 299.5509. *Part 201, Environmental Remediation, of the Natural Resources and Environmental Protection Act, 1994 PA 451, as amended (NREPA).
U.S. EPA considers this remedy to be a final remedy for Operable Units I and III.
- Michigan Air Pollution Control Act 348 (1965) Part 2,3,9 and 10. *Part 55, Air Pollution Control, of the NREPA.

Action Specific

- Clean Air Act (CAA), 40 CFR Parts 50, 51
- Federal Protection of Wetlands Act, 40 CFR 6, APP.A
- Michigan Act 203 (1974), Wetland Protection Act. *Part 303, Wetlands Protection, of the NREPA.
- Michigan Shoreland Protection and Management Act 245 (1970). *Part 323, Shorelands Protection and Management, of the NREPA.
- Michigan Act 347 (1972), Soil Erosion and Sedimentation Control Act, MCL 282.101 R 323.1701. *Part 91, Soil Erosion and Sedimentation Control, of the NREPA.
- Michigan Act 348 (1965), Parts 2, 3, 9, and 10, Air Pollution Act. *Part 55, Air Pollution Control, of the NREPA.

Location Specific

- Archaeological and Historic Preservation Act, 40 CFR 6.301(c)/16 USC 469
- National Historic Preservation act, 40 CFR 6.301(b)/16 USC 470
- Historic Sites, Buildings and Antiquities Act, 40 CFR 6.301(a)/16 USC 461-467
- Fish and Wildlife Coordination Act, 40 CFR 6.302(g)/16 USC 1531-1566
- Endangered Species Act, 50 CFR Parts 17 and 402/16 USC 1531-1543
- Protection of Wetlands. 40 CFR 6 (App. A)
- Michigan Endangered Species Act 203 (1974), MCL 299.221 R299.1021. *Part 365, Michigan Endangered Species, of the NREPA.

ATTACHMENT 7 (cont'd.)

Applicable or Relevant and Appropriate Requirements (ARARs)

- Michigan Wetland Protection Act 203 (1979), MCL 281.701 R281.921. *Part 303, Wetlands Protection, of the NREPA.
- Michigan Shoreland Protection and Management act 245 (1970), MCL 281.641. *Part 323, Shorelands Protection and Management, of the NREPA.
- Michigan Soil Erosion and Sedimentation Control act 347 (1972), MCL 282.101 R323.1701. *Part 91, Soil Erosion and Sedimentation Control, of the NREPA.

The following regulations are identified as to be considered (TBC) in the 1992 ROD:

- Occupational Safety and Health Act, 29 CFR 120
- Michigan Act 154, Rule 3301 (1974), Michigan Occupational Safety and Health Act.
- MCLA 257.722, Michigan Vehicle Code

* Updated citation. While ARARs are frozen at the time the ROD is signed, the MDEQ has indicated that the citations for some state ARARs (*) can be updated without changing the statutes. For example, the citation for Michigan Environmental Response act 307 (1982) can be updated to Part 201, Environmental Remediation, of the Natural Resources and Environmental Protection Act, 1994 PA 451, as amended (NREPA). When the Natural Resources and Environmental Protection Act (Act 451) was adopted in 1994, it simply consolidated state environmental statutes, but did not change them. Thus, Act 307 became Part 201 of Act 451 but nothing that was in Act 301 changed. However, revisions to Part 201 did come later (1995).